



5

GROGREEN  
FIVE





# 5 GROGREEN FIVE

The **GROGREEN FIVE** product line is the first of its kind, combining high levels of NPK with calcium, magnesium and all needed trace elements.

These gel products are a state of the art solution for drip irrigation, combining 3 different applications in one: the supply of the macronutrients, supply of calcium and acidification of the soil.

The product provides acidity to neutralize and dissolve bicarbonates, avoiding clogging of drippers. The unique composition makes it the number one solution for soils that suffer from alkalinity and salinity.

## Why use **GROGREEN FIVE** range

- Corrects multiple nutritional deficiencies especially in alkaline soils where the majority of nutrients are not available
- Efficient nutrition during all crop stages thanks to its balanced formulas and the presence of the essential nutrients
- Low pH 2-2.5 in order to increase soil nutrient availability and help to prevent precipitates, keeping irrigation systems clean
- Full solubility, no sediment or blockages
- Improves significantly crop yields and quality thanks to its high solubility and assimilation by the plant
- Neutralizes alkaline soils and hard water conditions
- Improves the amount of Ca available for crops in alkaline soils and helps to reduce salinity
- An all-in-one product containing the FIVE most important elements for crops

## Proven performance in the field

Grogreen FIVE range has been tried and tested on representative crops such as tomato and melon by independent researchers at a trial station located in Alberic, Valencia, Spain. These trials showed that the Grogreen FIVE range is an outstandingly effective fertilization treatment for both tomato and watermelon.

### Small scale experimental trial Grogreen Five range on Tomato and Watermelon plants

The trial carried out from July to November 2019 in Spain, in collaboration with R&D Lima Europe department, confirms such good results in yield, number of flowers, number of fruits and plant vigour. Further studies are required to conclude the benefits.

# TEST SITE INFORMATION

Crop: Tomato under open field conditions  
 Variety: Globetrotter  
 Locality: Alberic (Valencia), Spain  
 Plot size(m<sup>2</sup>)/Number of plants: 12/6  
 Number of variants/Number of replicates: 2/4  
 Type of soil: Loam  
 Soil pH: 8  
 Timing: July - November 2019

## Application and Product description

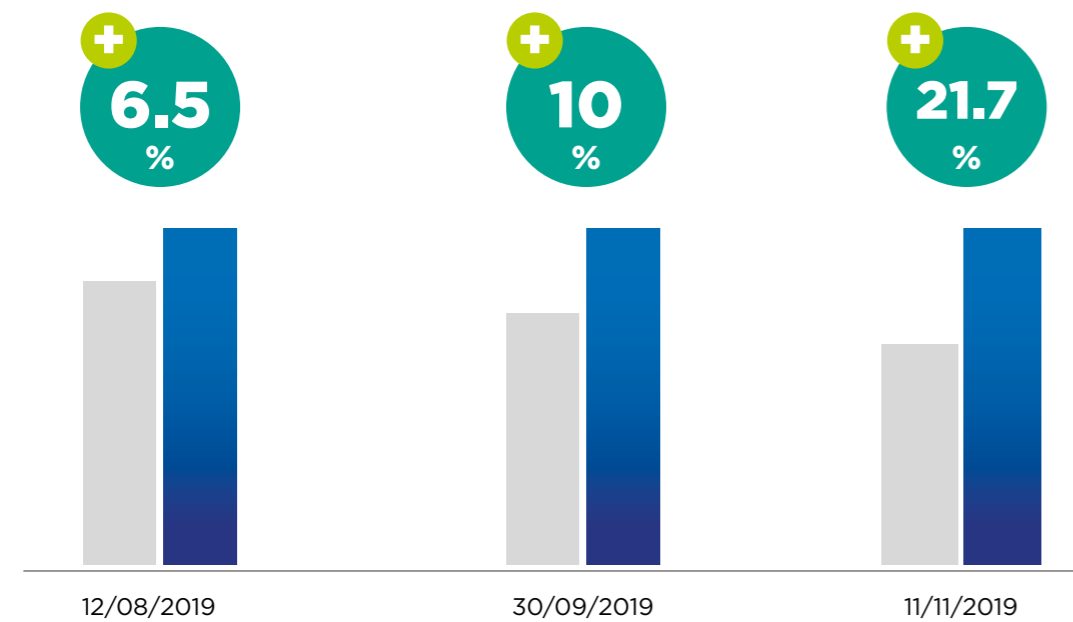
T	Products	Dosage Rate
T1	Control	
T2	FIVE Terra, Multi, Fructus	12 kg/ha
		15 kg/ha
		20 kg/ha

## Fertilization

General base dressing

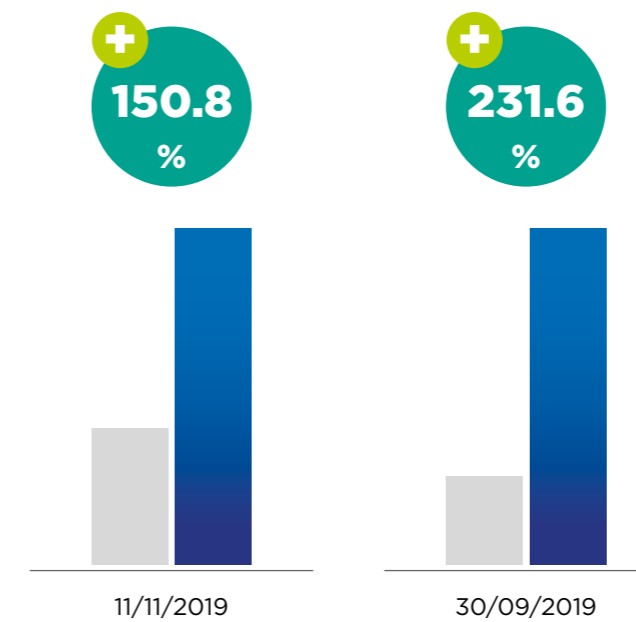


### Plant vigour:



Control  
 FIVE Terra, Multi, Fructus

### Yield:



Control  
 FIVE Terra, Multi, Fructus

### Fruits per plant:

### Conclusions

The applications were performed by drip irrigation application in the tomato plants.

**Plants vigour assessment:**  
 All treatments showed better vigour than untreated plots.

**Number of flowers and fruits:** Plots treated with Grogreen Five Multi, Terra and Fructus showed higher amount of flowers and fruits compared to untreated plots (Control).

**Yield assessment:** Treated plots showed higher yield

# TEST SITE INFORMATION

Crop: Watermelon under open field conditions  
 Variety: Sugar baby  
 Locality: Alberic (Valencia), Spain  
 Plot size(m<sup>2</sup>)/Number of plants: 15/6  
 Number of variants/Number of replicates: 2/4  
 Type of soil: Loam  
 Soil pH: 8  
 Timing: July - 30th September 2019

## Application and Product description

T	Products	Dosage Rate
T1	Control	
T2	FIVE Terra, Multi	12 kg/ha
		15 kg/ha
T2	FIVE Fructus	12, 15, 20 kg/ha

**Fertilization**  
 General base dressing



## Conclusions

The applications were performed by drip irrigation application in the watermelon plants.

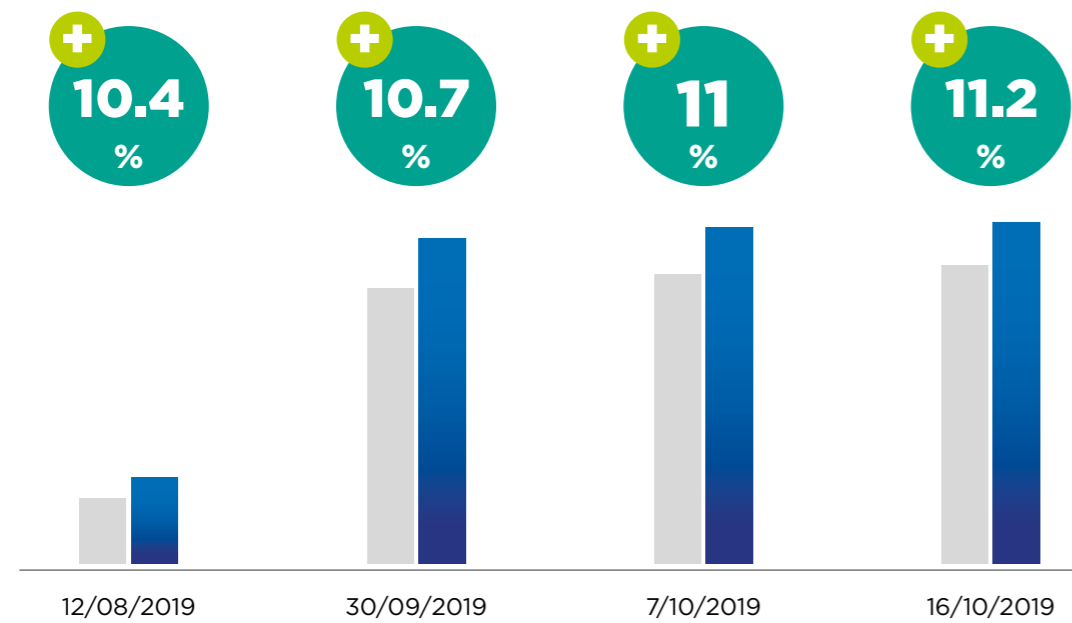
**Plants vigour assessment:** All treatment plots showed better vigour than the untreated plots.

**Plants length:** Treated plots showed higher length.

**Number of flowers and fruits:** Plots treated with Grogreen Five Multi, Terra and Fructus showed higher amount of flowers and fruits.

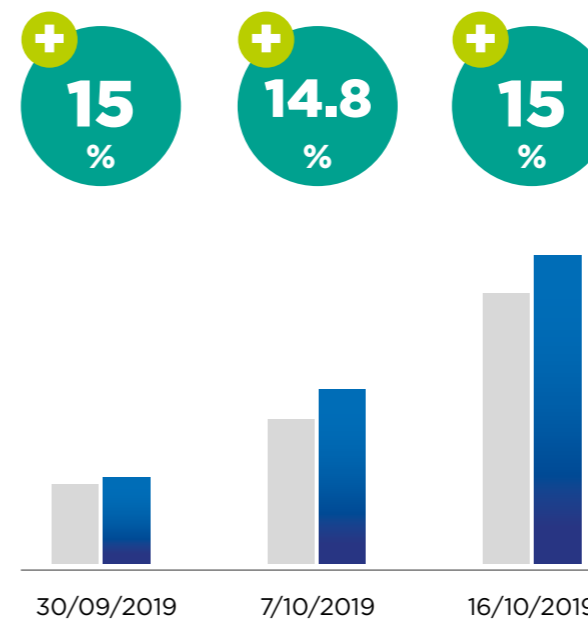
**Yield assessment:** Treated plots showed higher yields. In general treated plots showed higher yield of marketable fruits and lower unmarketable weights.

Plants length:



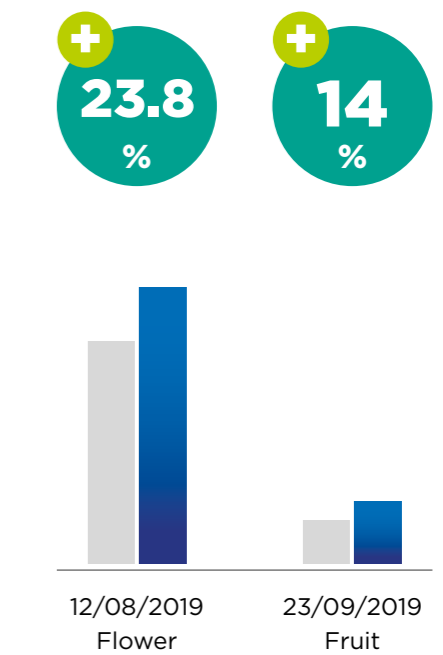
Control  
 FIVE Terra, Multi, Fructus

Yield:



Control  
 FIVE Terra, Multi, Fructus

Flowers and fruits per plant:



# FIVE MULTI

**20-20-20 + 6 CaO + 3 MgO + TE**

- **Balanced NPK formulation with high levels of calcium and magnesium with trace elements.**
- **High solubility of all nutrients keeping irrigation systems clean.**
- **Acidifying properties combined with calcium improves alkaline soil conditions.**
- **Designed for use throughout entire growth cycle**



**Packing size**  
10 kg, 5kg

## Application rates and timings

### **Tomato, cucumber, etc.**

apply 12 - 20 kg/ha/application from 2 - 3 times/week during the accelerated vegetative growth and during the fruit development stage.

### **Melon, watermelon, squash**

apply 12 - 16 kg/ha/application 2 - 3 times/week during the accelerated vegetative growth and fruit bulking stage.

### **Strawberries**

apply 12 - 15 kg/ha/application 2 - 3 times/week during the vegetative growth; repeat on green fruits till before fruit colouring.

*For continuous fertigation, the recommended concentration of FIVE Multi varies from 0.5 to 2 g/l (0.05 to 0.2 %). This balanced formulation is best suited for applications during vegetative crop development.*

## Recommendations

FIVE Multi is a single-tank mix GEL providing plants with all the necessary nutrients.

FIVE Multi can be mixed with calcium nitrate without the risk of precipitation. Do not mix with other NPK, phosphate and/or sulphate containing fertilizers.

When mixing with other chemicals, it is recommended to perform small scale trials before using on a large scale.

# FIVE TERRA

**12-44-12 + 6 CaO + 3 MgO + TE**



**Packing size**  
10 kg, 5kg

- High phosphorous formula with high levels of calcium and magnesium with trace elements.
- 100% water soluble without any precipitations or sediments.
- Low pH increasing soil nutrient availability.
- Designed for use during root development and flower initiation stages

## Application rates and timings

### **Tomato, cucumber, etc.**

apply 12 – 20 kg/ha/application from 2 – 3 times/week after transplanting or germination till fruit setting.

### **Melon, watermelon, squash**

apply 12 – 16 kg/ha/application 2 – 3 times/week after transplanting till fruit setting.

### **Strawberries**

apply 12 – 15 kg/ha/application 2 – 3 times/week after transplanting till the apparition of first fruits.

*For continuous fertigation, the recommended concentration of FIVE Terra varies from 0.5 to 2 g/l (0.05 to 0.2 %). The high phosphorous formulation is best suited for root development (tuber initiation in potato, after transplanting vegetables, beginning root activity of fruit trees), during tillering of wheat and during flower initiation.*

## Recommendations

FIVE Terra is a single-tank mix GEL providing plants with all the necessary nutrients.

FIVE Terra can be mixed with calcium nitrate without the risk of precipitation.

Do not mix with other NPK, phosphate and/or sulphate containing fertilizers.

When mixing with other chemicals, it is recommended to perform small scale trials before using on a large scale.





# FIVE FRUCTUS

**18-9-36 + 6 CaO + 3 MgO + TE**



**Packing size**  
10 kg, 5kg

- High potassium formula with high levels of calcium and magnesium with TE.
- Improving yield and quality of fruits.
- 3 in 1 action (NPK - Calcium supply - Acidification).
- Designed for use during fruit development and maturation stages.

## Application rates and timings

### **Tomato, cucumber, etc.**

apply 12 – 20 kg/ha/application from 2 – 3 times/week after fruit setting till fruit maturity.  
Alternate with FIVE MULTI and FIVE TERRA for new flowers and fruits.

### **Melon, water melon, squash**

apply 12 – 16 kg/ha/application 2 – 3 times/week after fruit setting till 10 – 15 days before harvest.

### **Strawberries**

apply 12 – 15 kg/ha/application 2 – 3 times/week after fruit setting till maturity.  
Alternate with FIVE MULTI and FIVE TERRA for new flowers and fruits.

*For continuous fertigation, the recommended concentration of FIVE FRUCTUS varies from 0.5 to 2 g/l (0.05 to 0.2 %). The high potassium formulation is best suited for applications during fruit growth and maturation.*

## Recommendations

GEL FIVE FRUCTUS is a single-tank mix GEL providing plants with all the necessary nutrients.  
GEL FIVE FRUCTUS can be mixed with calcium nitrate without the risk of precipitation.  
Do not mix with other NPK, phosphate and/or sulphate containing fertilizers.  
When mixing with other chemicals, it is recommended to perform small scale trials before using on a large scale.

# CROP RECOMMENDATIONS







## 1. Strawberry

The strawberry plant is herbaceous and perennial. Strawberry cultivars can be classified into three basic flowering habits: short-day, long-day, and day-neutral. The cultivars vary widely in size, color, flavour, shape, degree of fertility, season of ripening, liability to disease and constitution of plant.

Strawberry plants prefer balanced soils, rich in organic matter, well drained and with a good balance between aeration and water retaining capacities. A sandy or loamysandy and homogeneously deep soil would be ideal for cultivation.

Alkaline soils can affect the nutrient availability and the plant can manifest iron chlorosis. The use of acidifying fertilizers like Grogreen FIVE, are recommended and can reduce the negative effect of alkaline soils to a certain extent. Also, strawberries are very sensitive to saline soils.

For an average yield of 40-50 t/ha, the nutritional requirements are shown in the next table.

**NUTRITIONAL REQUIREMENTS (kg/ha). YIELD: 40-50 t/ha. DENSITY: 50,000 plants/ha**

N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	CaO	MgO
200	180	250	70	25

### STRAWBERRY NUTRITION



<b>High Phosphorus</b>	<b>FIVE Terra</b>	12 - 15 kg/ha/application 2 - 3 times/week after transplanting until the apparition of first fruits
<b>Balanced Nutrition</b>	<b>FIVE Multi</b>	12 - 15 kg/ha/ application 2 - 3 times/ week during the vegetative growth
<b>High Potassium</b>	<b>FIVE Fructus</b>	12 - 15 kg/ha/application 2 - 3 times/week after fruit setting until maturity

## 2. Watermelon and melon

Both melon and watermelon are annual plants of the Cucurbitaceae family and with a creeping and climbing nature. Melon plant requires warm and not excessively humid climate, so that in humid regions with low insolation its development is adversely affected, showing alterations in ripening and fruit quality. Watermelon is less demanding in temperature than melon. In relation to the soil, watermelon needs light soils, rich in organic matter and well drained. Deep and loam soils, as well as sandy clay soils are good for watermelon growth too. Melon is less demanding, it needs soft, fertile, deep, well ventilated and drained soils.

**MELON NUTRITIONAL REQUIREMENTS IN kg/ha:**

Expected yield	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	CaO	MgO
35	110 - 140	50 - 60	250 - 330	80 - 90	30 - 40
50	225	105	450	175	85

**WATERMELON NUTRITIONAL REQUIREMENTS IN kg/ha:**

Expected yield	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	CaO	MgO
35	110 - 140	50 - 60	140 - 190	45	45
66-110	174-360	51-83	245-341	110-280	48-87

### MELON AND WATERMELON NUTRITION



<b>High Phosphorus</b>	<b>FIVE Terra</b>	12 - 16 kg/ha/application 2 - 3 times/week after transplanting or emergence until flowering
<b>Balanced Nutrition</b>	<b>FIVE Multi</b>	12 - 16 kg/ha/application 2 - 3 times/week
<b>High Potassium</b>	<b>FIVE Fructus</b>	12 - 16 kg/ha/application 2 - 3 times/ week after fruit setting until 10 - 15 days before harvest

### 3. Tomato

Tomato belongs to the Solanaceae family being an annual plant. Growth stages of plants, in very general terms, can be split into four periods: Establishment from planting or seeding during vegetative growth until first flower appears, from first flowering to first fruit set, from fruit ripening to first harvest, and from first harvest to the end of the last harvest.

The duration of each stage may vary according to growing method, variety characteristics and climatic conditions. Tomato is the most widespread vegetable in the world and with the most economical value.

Temperature is the primary factor influencing all stages of development of the plant. The optimum temperatures for growth are from 18° to the 27°C. Outside this range the production can be seriously affected. Optimum relative humidity ranges from 60% to 80%.

Tomatoes can be grown on soils with a wide range of textures, from light, sandy soils to heavy, clay soils. Sandy soils are preferable if early harvest is desired.

Under saline conditions, sodium and chloride compete with the uptake of nutrients and this affects the plant development and reduces yield.

**Tomato plant is sensitive to many nutritional deficiencies:**

- Calcium deficiency will manifest in the Blossom-End Rot (BER) symptom on the fruits further enhanced by salinity conditions.
- Zinc improves the plant tolerance to salt stress.

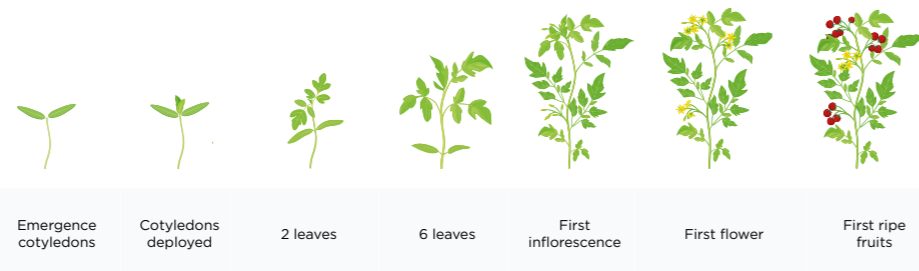
**Nutritional requirements**

Among the total amount of nutrient uptake, fruits absorb most of the nitrogen (65%), phosphorus (70%) and potassium (65%), the leaves and petioles being the ones that accumulate the most amount of calcium (76%) and magnesium (60%).

**NUTRITIONAL REQUIREMENTS IN kg/ha:**

Growth conditions	Yield	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	CaO	MgO
Greenhouse	200	430	130	630	340	120
Outdoor	150	417	108	724	374	110

**TOMATO NUTRITION**



<b>High Phosphorus</b>	<b>FIVE Terra</b>	12 - 20 kg/ha/application from 2 - 3 times/week after transplanting or germination till flower apparition
<b>Balanced Nutrition</b>	<b>FIVE Multi</b>	12 - 20 kg/ha/ application 2 - 3 times/ week during the vegetative growth
<b>High Potassium</b>	<b>FIVE Fructus</b>	12 - 20 kg/ha/ application





**Lima Europe NV**

Doelhaagstraat 77/1, 2840 Rumst - Belgium

Tel: +32 3 844 73 70 - Fax: +32 3 888 14 82

[www.lima-europe.com](http://www.lima-europe.com)