

Greenhouse Tomato - quantitative program in Israel



Tomato soil GH- south Israel quantitative

Crop cycle: 144 Days

Yield goal: 150.00 ton/ha

Plot: Israel

Plot size: 1 ha

Establishment

Nutrient supply for crop

Stage	Days	Macronutrients(kg/ha)			Secondary Nutrients (kg/ha)			Micronutrients (gram/ha)					
		N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Establishment	14	21.00	21.00	21.00	0.00	0.00	37.05	199.20	99.60	33.20	24.90	16.60	50.00

Fertilizers per stage

Fertilizers application (ha/day)



Multi-K GG 13-0-46 Potassium Nitrate

3.25 kg



Haifa MAP - Mono Ammonium Phosphate

2.46 kg



Ammonium Sulphate

3.65 kg



Borax - Disodium Tetraborate Decahydrate

31 gram



Haifa Micro Combi

198 gram

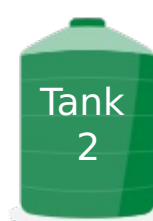
Nutrigation system


 Volume: **1000 liter**

 Content: **Phosphorus**

 Injection volume per day: **46.24 l/day**

 Fertilizer concentration: **20 %**

 Tanks per stage: **tanks**

 Volume: **1000 liter**

 Content: **Calcium**

 Injection volume per day: **39.60 l/day**

 Fertilizer concentration: **0.5 %**

 Tanks per stage: **tanks**

 Multi-K GG 13-0-46 Potassium Nitrate **69.17 kg**

 Haifa MAP - Mono Ammonium Phosphate **52.39 kg**

 Ammonium Sulphate **77.77 kg**

 Borax - Disodium Tetraborate Decahydrate **670 gram**

 Haifa Micro Combi **5.00 kg**

Stock solution nutrients content:

Tanks	Macronutrients (gram/liter)			Secondary Nutrients (gram/liter)			Micronutrients (mg/liter)					
	N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Phosphorus Tank 1	31.96	31.96	31.96	-	-	56.38	-	-	-	-	-	80
Calcium Tank 2	-	-	-	-	-	-	360	180	60	50	30	-

Fertilizers amounts for growth stage (per plot)



Multi-K GG 13-0-46 Potassium Nitrate

45.46 kg


Haifa MAP - Mono Ammonium Phosphate

34.43 kg


Ammonium Sulphate

51.11 kg


Borax - Disodium Tetraborate Decahydrate

434 gram


Haifa Micro Combi

2.77 kg
Amount

flowering

Nutrient supply for crop

Stage	Days	Macronutrients(kg/ha)			Secondary Nutrients (kg/ha)			Micronutrients (gram/ha)					
		N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
flowering	10	25.00	15.00	40.00	9.50	3.00	9.57	199.20	99.60	33.20	24.90	16.60	50.00

Fertilizers per stage

Fertilizers application (ha/day)

Multi-K GG 13-0-46 Potassium Nitrate 8.66 kg	Haifa MAP - Mono Ammonium Phosphate 2.46 kg	Ammonium Sulphate 1.32 kg
Haifa Mag / Magnisal Magnesium Nitrate 1.94 kg	Haifa Cal GG Calcium Nitrate 3.58 kg	Borax - Disodium Tetraborate Decahydrate 44 gram
Haifa Micro Combi 277 gram		

Nutrigation system



Volume: **1000 liter**
Content: **Phosphorus**
Injection volume per day: **62.33 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**



Volume: **1000 liter**
Content: **Calcium**
Injection volume per day: **28.98 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**

Multi-K GG 13-0-46 Potassium Nitrate	138.74 kg
Haifa MAP - Mono Ammonium Phosphate	39.40 kg
Ammonium Sulphate	21.15 kg
Borax - Disodium Tetraborate Decahydrate	706 gram

Haifa Mag / Magnisal Magnesium Nitrate	66.77 kg
Haifa Cal GG Calcium Nitrate	123.68 kg
Haifa Micro Combi	9.55 kg

Stock solution nutrients content:

Tanks	Macronutrients (gram/liter)			Secondary Nutrients (gram/liter)			Micronutrients (mg/liter)					
	N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Phosphorus Tank 1	27.90	24.04	64.10	-	-	15.34	-	-	-	-	-	80
Calcium Tank 2	26.18	-	-	32.78	10.35	-	690	340	110	90	60	-

Fertilizers amounts for growth stage (per plot)

Multi-K GG 13-0-46 Potassium Nitrate	Haifa MAP - Mono Ammonium Phosphate	Ammonium Sulphate	Haifa Mag / Magnisal Magnesium Nitrate	Haifa Cal GG Calcium Nitrate	Borax - Disodium Tetraborate Decahydrate	Haifa Micro Combi
86.58 kg	24.59 kg	13.20 kg	19.35 kg	35.85 kg	440 gram	2.77 kg

Amount







flowering and ripening

Nutrient supply for crop

Stage	Days	Macronutrients(kg/ha)			Secondary Nutrients (kg/ha)			Micronutrients (gram/ha)					
		N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
flowering and ripening	10	35.00	21.00	56.00	17.29	6.49	0.00	199.20	99.60	33.20	24.90	16.60	50.00

Fertilizers per stage

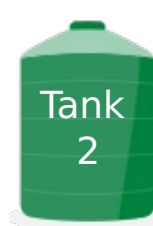
Fertilizers application (ha/day)

 Multi-K GG 13-0-46 Potassium Nitrate 12.12 kg	 Haifa MAP - Mono Ammonium Phosphate 3.44 kg	 Haifa Mag / Magnisal Magnesium Nitrate 4.18 kg
 Haifa Cal GG Calcium Nitrate 6.52 kg	 Haifa Micro Combi 277 gram	 Borax - Disodium Tetraborate Decahydrate 44 gram

Nutrigation system



Volume: **1000 liter**
Content: **Phosphorus**
Injection volume per day: **78.04 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**



Volume: **1000 liter**
Content: **Calcium**
Injection volume per day: **54.93 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**

Multi-K GG 13-0-46 Potassium Nitrate **155.32 kg**

Haifa MAP - Mono Ammonium Phosphate **44.11 kg**

Borax - Disodium Tetraborate Decahydrate **564 gram**

Haifa Mag / Magnisal Magnesium Nitrate **76.19 kg**

Haifa Cal GG Calcium Nitrate **118.77 kg**

Haifa Micro Combi **5.04 kg**

Stock solution nutrients content:

Tanks	Macronutrients (gram/liter)			Secondary Nutrients (gram/liter)			Micronutrients (mg/liter)					
	N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Phosphorus Tank 1	26.26	26.91	71.76	-	-	-	-	-	-	-	-	60
Calcium Tank 2	26.41	-	-	31.47	11.81	-	360	180	60	50	30	-

Fertilizers amounts for growth stage (per plot)

					
Multi-K GG 13-0-46 Potassium Nitrate	Haifa MAP - Mono Ammonium Phosphate	Haifa Mag / Magnisal Magnesium Nitrate	Haifa Cal GG Calcium Nitrate	Haifa Micro Combi	Borax - Disodium Tetraborate Decahydrate
121.21 kg	34.43 kg	41.85 kg	65.23 kg	2.77 kg	440 gram

Amount







beginning of harvesting

Nutrient supply for crop

Stage	Days	Macronutrients(kg/ha)			Secondary Nutrients (kg/ha)			Micronutrients (gram/ha)					
		N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
beginning of harvesting	10	42.95	26.50	71.50	28.80	11.00	29.29	199.20	99.60	33.20	24.90	16.60	50.00

Fertilizers per stage

Fertilizers application (ha/day)

 Multi-K GG 13-0-46 Potassium Nitrate 15.48 kg	 Haifa MAP - Mono Ammonium Phosphate 4.34 kg	 Haifa BitterMag Magnesium Sulphate 6.88 kg
 Haifa Cal GG Calcium Nitrate 10.87 kg	 Haifa Micro Combi 277 gram	 Borax - Disodium Tetraborate Decahydrate 44 gram

Nutrigation system



Volume: **1000 liter**
Content: **Phosphorus**
Injection volume per day: **133.70 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**



Volume: **1000 liter**
Content: **Calcium**
Injection volume per day: **55.72 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**

Multi-K GG 13-0-46 Potassium Nitrate	115.75 kg
Haifa MAP - Mono Ammonium Phosphate	32.49 kg
Haifa BitterMag Magnesium Sulphate	51.42 kg
Borax - Disodium Tetraborate Decahydrate	329 gram

Haifa Cal GG Calcium Nitrate	195.03 kg
Haifa Micro Combi	4.97 kg

Stock solution nutrients content:

Tanks	Macronutrients (gram/liter)			Secondary Nutrients (gram/liter)			Micronutrients (mg/liter)					
	N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Phosphorus Tank 1	19.53	19.82	53.48	-	8.23	21.91	-	-	-	-	-	40
Calcium Tank 2	30.23	-	-	51.68	-	-	360	180	60	40	30	-

Fertilizers amounts for growth stage (per plot)

					
Multi-K GG 13-0-46 Potassium Nitrate	Haifa MAP - Mono Ammonium Phosphate	Haifa BitterMag Magnesium Sulphate	Haifa Cal GG Calcium Nitrate	Haifa Micro Combi	Borax - Disodium Tetraborate Decahydrate
154.76 kg	43.44 kg	68.75 kg	108.68 kg	2.77 kg	440 gram

Amount

Harvesting

Nutrient supply for crop

Stage	Days	Macronutrients(kg/ha)			Secondary Nutrients (kg/ha)			Micronutrients (gram/ha)					
		N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Harvesting	50	250.00	147.00	397.00	179.65	75.00	199.69	1494.00	747.00	249.00	186.75	124.50	390.00

Fertilizers per stage

Fertilizers application (ha/day)

Multi-K GG 13-0-46 Potassium Nitrate 17.19 kg	Haifa MAP - Mono Ammonium Phosphate 4.82 kg	Haifa BitterMag Magnesium Sulphate 9.38 kg
Haifa Cal GG Calcium Nitrate 13.56 kg	Haifa Micro Combi 415 gram	Borax - Disodium Tetraborate Decahydrate 69 gram

Nutrigation system



Volume: **1000 liter**
Content: **Phosphorus**
Injection volume per day: **157.25 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**



Volume: **1000 liter**
Content: **Calcium**
Injection volume per day: **69.86 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**

Multi-K GG 13-0-46 Potassium Nitrate	109.29 kg
Haifa MAP - Mono Ammonium Phosphate	30.65 kg
Haifa BitterMag Magnesium Sulphate	59.62 kg
Borax - Disodium Tetraborate Decahydrate	437 gram

Haifa Cal GG Calcium Nitrate	194.06 kg
Haifa Micro Combi	5.94 kg

Stock solution nutrients content:

Tanks	Macronutrients (gram/liter)			Secondary Nutrients (gram/liter)			Micronutrients (mg/liter)					
	N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Phosphorus Tank 1	18.43	18.70	50.49	-	9.54	25.40	-	-	-	-	-	50
Calcium Tank 2	30.08	-	-	51.43	-	-	430	210	70	50	40	-

Fertilizers amounts for growth stage (per plot)

Multi-K GG 13-0-46 Potassium Nitrate	Haifa MAP - Mono Ammonium Phosphate	Haifa BitterMag Magnesium Sulphate	Haifa Cal GG Calcium Nitrate	Haifa Micro Combi	Borax - Disodium Tetraborate Decahydrate
859.30 kg	241.00 kg	468.75 kg	677.90 kg	20.75 kg	3.45 kg

Amount

Harvesting end

Nutrient supply for crop

Stage	Days	Macronutrients(kg/ha)			Secondary Nutrients (kg/ha)			Micronutrients (gram/ha)					
		N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Harvesting end	50	286.02	176.00	476.00	192.00	80.00	213.00	1494.00	747.00	249.00	186.75	124.50	390.00

Fertilizers per stage

Fertilizers application (ha/day)

Multi-K GG 13-0-46 Potassium Nitrate 20.61 kg	Haifa MAP - Mono Ammonium Phosphate 5.77 kg	Haifa BitterMag Magnesium Sulphate 10.00 kg
Haifa Cal GG Calcium Nitrate 14.49 kg	Haifa Micro Combi 415 gram	Borax - Disodium Tetraborate Decahydrate 69 gram

Nutrigation system



Volume: **1000 liter**
Content: **Phosphorus**
Injection volume per day: **182.23 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**



Volume: **1000 liter**
Content: **Calcium**
Injection volume per day: **74.53 l/day**
Fertilizer concentration: **20 %**
Tanks per stage: **tanks**

Multi-K GG 13-0-46 Potassium Nitrate	113.08 kg
Haifa MAP - Mono Ammonium Phosphate	31.67 kg
Haifa BitterMag Magnesium Sulphate	54.88 kg
Borax - Disodium Tetraborate Decahydrate	377 gram

Haifa Cal GG Calcium Nitrate	194.43 kg
Haifa Micro Combi	5.57 kg

Stock solution nutrients content:

Tanks	Macronutrients (gram/liter)			Secondary Nutrients (gram/liter)			Micronutrients (mg/liter)					
	N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B
Phosphorus Tank 1	19.07	19.32	52.24	-	8.78	23.38	-	-	-	-	-	40
Calcium Tank 2	30.14	-	-	51.52	-	-	400	200	70	50	30	-

Fertilizers amounts for growth stage (per plot)









Multi-K GG 13-0-46 Potassium Nitrate	Haifa MAP - Mono Ammonium Phosphate	Haifa BitterMag Magnesium Sulphate	Haifa Cal GG Calcium Nitrate	Haifa Micro Combi	Borax - Disodium Tetraborate Decahydrate
1030.30 kg	288.50 kg	500.00 kg	724.55 kg	20.75 kg	3.45 kg

Amount

Total nutrient supply for season

Stage	Days	Macronutrients(kg/ha)			Secondary Nutrients (kg/ha)			Micronutrients (gram/ha)						Irrigation	
		N_Total	P2O5	K2O	CaO	MgO	SO4	Fe	Mn	Zn	Cu	Mo	B	Interval (Days)	Volume (m3/ha/day)
Establishment	14	21.00	21.00	21.00	0.00	0.00	37.05	199.20	99.60	33.20	24.90	16.60	50.00	1	1
flowering	10	25.00	15.00	40.00	9.50	3.00	9.57	199.20	99.60	33.20	24.90	16.60	50.00	1	1
flowering and ripening	10	35.00	21.00	56.00	17.29	6.49	0.00	199.20	99.60	33.20	24.90	16.60	50.00	1	1
beginning of harvesting	10	42.95	26.50	71.50	28.80	11.00	29.29	199.20	99.60	33.20	24.90	16.60	50.00	1	1
Harvesting	50	250.00	147.00	397.00	179.65	75.00	199.69	1494.00	747.00	249.00	186.75	124.50	390.00	1	1
Harvesting end	50	286.02	176.00	476.00	192.00	80.00	213.00	1494.00	747.00	249.00	186.75	124.50	390.00	1	1
Total	144	659.97	406.50	1061.50	427.24	175.49	488.60	3784.80	1892.40	630.80	473.10	315.40	980.00		

Total for season per plot

Stage	Establishment	flowering	flowering and ripening	beginning of harvesting	Harvesting	Harvesting end	Total
 Multi-K GG 13-0-46 Potassium Nitrate	45.46 kg	86.58 kg	121.21 kg	154.76 kg	859.30 kg	1030.30 kg	2.3 ton
 Haifa MAP - Mono Ammonium Phosphate	34.43 kg	24.59 kg	34.43 kg	43.44 kg	241.00 kg	288.50 kg	666.39 kg
 Ammonium Sulphate	51.11 kg	13.20 kg	-	-	-	-	64.31 kg
 Haifa BitterMag Magnesium Sulphate	-	-	-	68.75 kg	468.75 kg	500.00 kg	1.0 ton
 Haifa Mag / Magnisal Magnesium Nitrate	-	19.35 kg	41.85 kg	-	-	-	61.20 kg
 Haifa Cal GG Calcium Nitrate	-	35.85 kg	65.23 kg	108.68 kg	677.90 kg	724.55 kg	1.6 ton
 Haifa Micro Combi	2.77 kg	2.77 kg	2.77 kg	2.77 kg	20.75 kg	20.75 kg	52.58 kg
 Borax - Disodium Tetraborate Decahydrate	434 gram	440 gram	440 gram	440 gram	3.45 kg	3.45 kg	8.65 kg

Environmental Footprint

Environmental parameters

	Haifa-fertigation	Topsoil application	Fertigation rating performance
Env. Footprint single score $\mu\text{Pt/Kg produce}$	1.19e+4	1.89e+4	EXCELLENT
Carbon footprint $\text{kg CO}_2 \text{ eq./Kg produce}$	6.18e-2	1.05e-1	EXCELLENT
N leaching $\text{kg NO}_3/\text{Kg produce}$	8.20e-5	5.98e-4	EXCELLENT
N runoff $\text{kg NO}_3/\text{Kg produce}$	2.48e-6	2.24e-5	EXCELLENT
N volatilization $\text{kg NH}_3/\text{Kg produce}$	5.34e-5	1.06e-3	EXCELLENT
Eutrophication, freshwater $\text{kg P eq./Kg produce}$	3.05e-5	9.71e-5	EXCELLENT

*INDEX (Fertigation vs Topsoil)

EXCELLENT	BETTER	EQUAL	BAD	WORSE
>30%	10 to 30%	10 to -10%	-10 to -30%	<-30%

* % Difference between fertigation and topsoil application

NutriNet calculates the difference between the environmental footprint of fertigation programs compared to top-soil fertilizer application. In both cases NutriNet uses the same field characteristics, however, fertilizer composition is different and thus the overall values of the environmental footprint are different.