

## Basic Quantitative Program - Lettuce



Lettuce Open field , French Quantitative

**Crop cycle:** 42 Days

**Yield goal:** 50.00 ton/ha

**Plot:** Mex san loam

**Plot size:** 1 ha

### Transplanting

#### 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
Transplanting	7	8.80	11.55	3.85	6.16	0.22	5.70	164.34	82.17	27.39	20.54	13.70	0.00

#### Fertilizers per stage

##### Fertilizers application (ha/day)

 Haifa MAP - Mono Ammonium Phosphate 2.66 kg	 Haifa SOA Ammonium Sulphate 1.12 kg	 Multi-npK 13-2-44 Multi-K Enriched 1.24 kg
 Haifa Mag / Magnisal Magnesium Nitrate 203 gram	 Haifa Cal GG Calcium Nitrate 3.32 kg	 Haifa Micro Combi 326 gram

#### Nutrigation system



Volume: **1000 liter**  
Content: **Phosphorus**  
Injection volume per day: **25.16 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**



Volume: **1000 liter**  
Content: **Calcium**  
Injection volume per day: **19.27 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**

Haifa MAP - Mono Ammonium Phosphate **105.89 kg**

Haifa SOA Ammonium Sulphate **44.66 kg**

Multi-npK 13-2-44 Multi-K Enriched **49.46 kg**

Haifa Mag / Magnisal Magnesium Nitrate **10.53 kg**

Haifa Cal GG Calcium Nitrate **172.53 kg**

Haifa Micro Combi **16.94 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	28.66	65.58	21.86	-	-	32.38	-	-	-	-	-	-
Calcium   Tank 2	27.85	-	-	45.72	1.63	-	1220	610	200	150	100	-

#### Fertilizers amounts for growth stage (per plot)

 Haifa MAP - Mono Ammonium Phosphate <b>18.65 kg</b>	 Haifa SOA Ammonium Sulphate <b>7.87 kg</b>	 Multi-npK 13-2-44 Multi-K Enriched <b>8.71 kg</b>	 Haifa Mag / Magnisal Magnesium Nitrate <b>1.42 kg</b>	 Haifa Cal GG Calcium Nitrate <b>23.25 kg</b>	 Haifa Micro Combi <b>2.28 kg</b>
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Amount

## Vegetative

### 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
Vegetative	14	39.60	30.80	30.80	15.40	0.55	52.36	438.24	219.12	73.04	54.78	36.52	0.00

### Fertilizers per stage

#### Fertilizers application (ha/day)



Haifa MAP - Mono Ammonium Phosphate  
3.44 kg



Haifa SOA Ammonium Sulphate  
5.16 kg



Multi-nPK 13-2-44 Multi-K Enriched  
4.98 kg



Haifa Mag / Magnisal Magnesium Nitrate  
253 gram



Haifa Cal GG Calcium Nitrate  
4.15 kg



Haifa Micro Combi  
435 gram

#### Nutrigation system



Volume: **1000 liter**  
Content: **Phosphorus**  
Injection volume per day: **67.89 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**



Volume: **1000 liter**  
Content: **Calcium**  
Injection volume per day: **24.15 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**

Haifa MAP - Mono Ammonium Phosphate **50.71 kg**

Haifa SOA Ammonium Sulphate **75.98 kg**

Multi-nPK 13-2-44 Multi-K Enriched **73.31 kg**

Haifa Mag / Magnisal Magnesium Nitrate **10.48 kg**

Haifa Cal GG Calcium Nitrate **171.56 kg**

Haifa Micro Combi **17.97 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	31.79	32.40	32.40	-	-	55.09	-	-	-	-	-	-
Calcium   Tank 2	27.69	-	-	45.46	1.62	-	1290	650	220	160	110	-

#### Fertilizers amounts for growth stage (per plot)



Haifa MAP - Mono Ammonium Phosphate

**48.20 kg**



Haifa SOA Ammonium Sulphate

**72.23 kg**



Multi-nPK 13-2-44 Multi-K Enriched

**69.68 kg**



Haifa Mag / Magnisal Magnesium Nitrate

**3.54 kg**



Haifa Cal GG Calcium Nitrate

**58.11 kg**



Haifa Micro Combi

**6.09 kg**

Amount

### Initiation head formation

#### 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
Initiation head formation	14	75.90	30.80	30.80	15.40	0.55	177.68	328.68	164.34	54.78	41.08	27.39	0.00

#### Fertilizers per stage

##### Fertilizers application (ha/day)



Haifa MAP - Mono Ammonium Phosphate  
3.44 kg



Haifa SOA Ammonium Sulphate  
17.51 kg



Multi-npK 13-2-44 Multi-K Enriched  
4.98 kg



Haifa Mag / Magnisal Magnesium Nitrate  
253 gram



Haifa Cal GG Calcium Nitrate  
4.15 kg



Haifa Micro Combi  
326 gram

##### Nutrigation system



Volume: **1000 liter**  
Content: **Phosphorus**  
Injection volume per day: **129.62 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**



Volume: **1000 liter**  
Content: **Calcium**  
Injection volume per day: **23.61 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**

Haifa MAP - Mono Ammonium Phosphate **26.56 kg**

Haifa SOA Ammonium Sulphate **135.04 kg**

Multi-npK 13-2-44 Multi-K Enriched **38.40 kg**

Haifa Mag / Magnisal Magnesium Nitrate **10.72 kg**

Haifa Cal GG Calcium Nitrate **175.50 kg**

Haifa Micro Combi **13.79 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	36.65	16.97	16.97	-	-	97.91	-	-	-	-	-	-
Calcium   Tank 2	28.33	-	-	46.51	1.66	-	990	500	170	120	80	-

#### Fertilizers amounts for growth stage (per plot)



Haifa MAP - Mono Ammonium Phosphate

**48.20 kg**



Haifa SOA Ammonium Sulphate

**245.08 kg**



Multi-npK 13-2-44 Multi-K Enriched

**69.68 kg**



Haifa Mag / Magnisal Magnesium Nitrate

**3.54 kg**



Haifa Cal GG Calcium Nitrate

**58.11 kg**



Haifa Micro Combi

**4.56 kg**

Amount

## Head closing

### 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
Head closing	7	37.40	15.40	15.40	7.70	0.55	86.30	164.34	82.17	27.39	20.54	13.70	0.00

### Fertilizers per stage

#### Fertilizers application (ha/day)



Haifa MAP - Mono Ammonium Phosphate  
3.44 kg



Haifa SOA Ammonium Sulphate  
17.00 kg



Multi-npK 13-2-44 Multi-K Enriched  
4.98 kg



Haifa Mag / Magnisal Magnesium Nitrate  
507 gram



Haifa Cal GG Calcium Nitrate  
4.15 kg



Haifa Micro Combi  
326 gram

#### Nutrigation system



Volume: **1000 liter**  
Content: **Phosphorus**  
Injection volume per day: **127.12 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**



Volume: **1000 liter**  
Content: **Calcium**  
Injection volume per day: **24.92 l/day**  
Fertilizer concentration: **20 %**  
Tanks per stage: **tanks**

Haifa MAP - Mono Ammonium Phosphate **27.09 kg**

Haifa SOA Ammonium Sulphate **133.76 kg**

Multi-npK 13-2-44 Multi-K Enriched **39.15 kg**

Haifa Mag / Magnisal Magnesium Nitrate **20.34 kg**

Haifa Cal GG Calcium Nitrate **166.57 kg**

Haifa Micro Combi **13.08 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	36.55	17.31	17.31	-	-	96.98	-	-	-	-	-	-
Calcium   Tank 2	27.95	-	-	44.14	3.15	-	940	470	160	120	80	-

#### Fertilizers amounts for growth stage (per plot)



Haifa MAP - Mono Ammonium Phosphate

**24.10 kg**



Haifa SOA Ammonium Sulphate

**119.03 kg**



Multi-npK 13-2-44 Multi-K Enriched

**34.84 kg**



Haifa Mag / Magnisal Magnesium Nitrate

**3.55 kg**



Haifa Cal GG Calcium Nitrate

**29.06 kg**



Haifa Micro Combi

**2.28 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)
Transplanting	7	8.80	11.55	3.85	6.16	0.22	5.70	164.34	82.17	27.39	20.54	13.70	0.00	1	1
Vegetative	14	39.60	30.80	30.80	15.40	0.55	52.36	438.24	219.12	73.04	54.78	36.52	0.00	1	1
Initiation head formation	14	75.90	30.80	30.80	15.40	0.55	177.68	328.68	164.34	54.78	41.08	27.39	0.00	1	1
Head closing	7	37.40	15.40	15.40	7.70	0.55	86.30	164.34	82.17	27.39	20.54	13.70	0.00	1	1
<b>Total</b>	<b>42</b>	<b>161.70</b>	<b>88.55</b>	<b>80.85</b>	<b>44.66</b>	<b>1.87</b>	<b>322.04</b>	<b>1095.60</b>	<b>547.80</b>	<b>182.60</b>	<b>136.94</b>	<b>91.31</b>	<b>0.00</b>		

**Total for season per plot**

Stage	Transplanting	Vegetative	Initiation head formation	Head closing	Total
 Multi-nPK 13-2-44 Multi-K Enriched	8.71 kg	69.68 kg	69.68 kg	34.84 kg	<b>182.90 kg</b>
 Haifa SOA Ammonium Sulphate	7.87 kg	72.23 kg	245.08 kg	119.03 kg	<b>444.21 kg</b>
 Haifa MAP - Mono Ammonium Phosphate	18.65 kg	48.20 kg	48.20 kg	24.10 kg	<b>139.15 kg</b>
 Haifa Mag / Magnisal Magnesium Nitrate	1.42 kg	3.54 kg	3.54 kg	3.55 kg	<b>12.05 kg</b>
 Haifa Cal GG Calcium Nitrate	23.25 kg	58.11 kg	58.11 kg	29.06 kg	<b>168.53 kg</b>
 Haifa Micro Combi	2.28 kg	6.09 kg	4.56 kg	2.28 kg	<b>15.22 kg</b>

# Environmental Footprint

Environmental parameters	Haifa-fertigation	Topsoil application	Fertigation rating performance
<b>Env. Footprint single score</b> $\mu\text{Pt}/\text{Kg}$ produce	1.01e+4	1.05e+4	<b>EQUAL</b>
<b>Carbon footprint</b> $\text{kg CO}_2 \text{ eq.}/\text{Kg}$ produce	3.29e-2	6.14e-2	<b>EXCELLENT</b>
<b>N leaching</b> $\text{kg NO}_3/\text{Kg}$ produce	5.66e-5	4.10e-4	<b>EXCELLENT</b>
<b>N runoff</b> $\text{kg NO}_3/\text{Kg}$ produce	5.48e-6	4.93e-5	<b>EXCELLENT</b>
<b>N volatilization</b> $\text{kg NH}_3/\text{Kg}$ produce	3.93e-5	7.78e-4	<b>EXCELLENT</b>
<b>Eutrophication, freshwater</b> $\text{kg P eq.}/\text{Kg}$ produce	2.59e-5	6.22e-5	<b>EXCELLENT</b>

\*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.