HYDROPONIC GROW BAGS

LIQUID FEED GUIDELINES FOR

GREENHOUSE CUCUMBERS
AND
GREENHOUSE TOMATOES

GREENHOUSE CUCUMBERS

Fertiliser Quantities for Greenhouse Cucumber 100 x Concentrate Stock Solution – Run To Waste Galuku Cocopeat Growbags (kg/1000 L water)

	0-3 weeks	**3-5 weeks**	**5-12 weeks**	**12-end weeks**
SOLUTION A				
CALCIUM NITRATE	90.0 kg	97.5 kg	92.5 kg	90.0 kg
POTASSIUM NITRATE	0.0 kg	15.0 kg	25.0 kg	20.0 kg
AMMONIUM NITRATE	1.2 kg	1.2 kg	1.2 kg	1.2 kg
IRON CHELATES –EDTA 13%	0.85 kg	0.85 kg	0.85 kg	0.85 kg
SOLUTION B				
POTASSIUM NITRATE	55.0 kg	50.0 kg	50.0 kg	50.0 kg
POTASSIUM SULPHATE	7.5 kg	6.0 kg	4.0 kg	3.0 kg
MONO POTASSIUM PHOSPHATE	8.0 kg	10.0 kg	10.0 kg	9.0 kg
MONO AMMONIUM PHOSPHATE	6.0 kg	6.0 kg	6.0 kg	6.0 kg
PHOSPHORIC ACID – 81%				
MAGNESIUM SULPHATE (Epsom Salt)	31.0 kg	33.0 kg	35.0 kg	33.0 kg
MANGANESE SULPHATE -32%Mn	185 g	185 g	200 g	200 g
ZINC SULPHATE –23%Zn	90 g	90 g	90 g	90 g
SODIUM BORATE –11.3%B	290 g	290 g	290 g	290 g
COPPER SULPHATE –25%Cu	20 g	20 g	20 g	20 g
SODIUM MOLYBDATE -40%Mo	12 g	12 g	12 g	12 g

From the above formulas, the typical nutrient element composition is outlined below when assuming standard element concentrations for each fertilizer and dilutions as outlined above.

	0-3 mg/L	**3-5 weeks**	**5-12 weeks**	**12 week to end**
Nitrogen-nitrate	212	238	238	232
Nitrogen-ammonium	9	9	9	9
Phosphorus	35	39	39	37
Potassium	268	307	338	311
Calcium	169	179	169	169
Magnesium	31	34	36	34
Sulphur	54	56	55	45
Iron	1.12	1.12	1.12	1.12
Manganese	0.60	0.60	0.65	0.65
Zinc	0.20	0.20	0.20	0.20
Boron	0.33	0.33	0.33	0.33
Copper	0.05	0.05	0.05	0.05
Molybdenum:	0.04	0.04	0.04	0.04
K/N ratio	1.21:1	1.25:1	1.37:1	1.29:1

Notes – Guidelines for use:

The four formulas are designed for the individual phases of plant growth.

The 0-3 week solution is designed for application prior to planting to charge the root zone environment and for the first 3 weeks of growth to flowering.

The 3-5 week solution is designed for fruit filling phase prior to harvest.

The 5-12 week solution is used during harvest and has the highest potassium to nitrogen ratio.

The 12 to end solution should be used for the rest of the cropping phase.

With a heavy crop load, add an additional 5.0 kg of Potassium Nitrate to Solution A, 10.0 kg of Potassium Nitrate to Solution B and 2.5 kg of Magnesium Sulphate to Solution B.

In all cases, run off solution and leaf analysis should be conducted to determine optimal nutritional management of the plants. It is advised to conduct this on a regular basis to identify trends in the nutritional uptake of plants.

Electrical Conductivity

The electrical conductivity supplied in the drip water will depend on the phase of growth, environmental conditions, crop performance, fruit load, varietal requirements etc.

The electrical conductivity of the drip water must be controlled by the grower. In hot weather, high light conditions, weak or highly generative growth use a lower electrical conductivity. With low light, cool weather, soft growth use a higher electrical conductivity. As a guide an electrical conductivity of 2.0 to 3.5 dS/m in the drip water is typically used under certain conditions.

In general, run off from the bags should be measured and recorded. Run off readings of 2.3 to 3.5 dS/m in run off are acceptable under certain conditions. Avoid high and low electrical conductivity readings for extended periods unless the conditions warrant them.

pH

The pH of the drip water should be applied at 5.3 to 6.0. The run off should be maintained at 5.3 to 6.5. If the pH is higher in the drip and run off solutions, Phosphoric Acid 81% should be added to the B solution at 1.0 L and then the pH monitored in the drip water and run off solution. If pH is still high continue to add Phosphoric Acid 81% gradually until 2.0 L of acid is used, further additions will require modifications to the feed solution supplied to plants.

Future B solutions may need to be modified to reduce the total amount of phosphorus supplied with 3.0 L of Phosphoric Acid 81%. For 1.0 L of Phosphoric Acid 81%, remove 1.5 kg of Mono Potassium Phosphate and add 1.0 kg of Potassium Sulphate to maintain similar phosphorus and potassium levels supplied.

Never exceed 5.0 L of Phosphoric Acid 81%, seek further advice on long term pH management of the nutrient solution and run off to improve long term nutrient balance. High use of Phosphoric Acid 81% will require adjustment to the Mono Potassium Phosphate and Mono Ammonium Phosphate ratios to supply more ammonium nitrogen in the liquid feed and better long term pH control.

Under rapid growth and nutrient uptake, the pH may rise. This can be regulated by the addition of Ammonium Nitrate, never use any more than 4.5 kg per 1000 L in total unless analysis confirms suitability. To restrict nitrate as nitrogen, Ammonium Sulphate could be trialled in several tanks but do not exceed 7% ammonium as the total nitrogen concentration.

When modifying the pH and electrical conductivity, make gradual changes to avoid rapid changes in the conditions in the growing media and root zone.

GREENHOUSE TOMATOES

Fertiliser Quantities for Greenhouse Tomato 100 x Concentrate Stock Solution – Run To Waste Galuku Cocopeat Growbags (kg/1000 L water)

	SATURATION	STARTER 0-5 weeks	STARTER 5-8 weeks	STANDARD to end
SOLUTION A				
CALCIUM NITRATE	105.0 kg	105.0 kg	100.0 kg	95.0 kg
POTASSIUM NITRATE	15.0 kg	5.0 kg	10.0 kg	15.0 kg
AMMONIUM NITRATE	2.0 kg	2.0 kg	2.0 kg	1.0 kg
IRON CHELATES –EDTA 13%	800 g	800 g	800 g	800 g
SOLUTION B				
POTASSIUM CHLORIDE (WSM)	25.0 kg	25.0 kg	25.0 kg	25.0 kg
POTASSIUM SULPHATE	30.0 kg	28.0 kg	28.0 kg	30.0 kg
MONO POTASSIUM PHOSPHATE	13.0 kg	13.0 kg	14.0 kg	16.0 kg
MONO AMMONIUM PHOSPHATE	4.0 kg	4.0 kg	3.0 kg	2.0 kg
PHOSPHORIC ACID – 81%	As required	As req	As req	As req
MAGNESIUM SULPHATE (Epsom)	65.0 kg	50.0 kg	52.0 kg	55.0 kg
MANGANESE SULPHATE - 32%Mn	180 g	180 g	180 g	180 g
ZINC SULPHATE –23%Zn	140 g	140 g	140 g	140 g
BORAX -11%B	330 g	290 g	290 g	290 g
COPPER SULPHATE –25%Cu	24 g	24 g	24 g	24 g
SODIUM MOLYBDATE-40%Mo	12 g	12 g	12 g	12 g

From the above formulas, the typical nutrient element composition is outlined below when assuming standard element concentrations for each fertilizer and dilutions as outlined above.

	Saturation	0-5 weeks	5-8 weeks	Standard to end
Nitrogen-nitrate	186	173	171	169
Nitrogen-ammonium	8	8	7	4
Phosphorus	47	41	41	43
Potassium	298	300	322	356
Calcium	197	197	188	179
Magnesium	65	50	52	55
Sulphur	140	117	120	126
Chloride	122	122	122	122
Iron	1.05	1.05	1.05	1.05
Manganese	0.58	0.58	0.58	0.58
Zinc	0.32	0.32	0.32	0.32
Boron	0.37	0.33	0.33	0.33
Copper	0.06	0.06	0.06	0.06
Molybdenum:	0.05	0.05	0.05	0.05
K/N ratio	1.54:1	1.66:1	1.81:1	2.06:1

Notes – Guidelines for use:

The four formulas are designed for the individual phases of plant growth.

The saturation solution is designed for new growing media and application prior to planting to charge the root zone environment.

The two starter solutions are designed for pre-flowering to second or third truss flowering phase (0-5 weeks) and then fruit filling phase (5 to 8 weeks).

The standard solution should be used for the rest of the cropping phase. With a heavy fruit load, reduce Calcium Nitrate to 90.0 kg and increase Potassium Nitrate to 30.0 kg and raise Magnesium Sulphate to 60.0 kg at 2 weeks prior to picking for the first two trusses.

Thereafter, revert back to the standard solution but also rely on analysis to determine the most suitable management.

In all cases, run off solution and leaf analysis should be conducted to determine optimal nutritional management of the plants. It is advised to conduct this on a regular basis to identify trends in the nutritional uptake.

Electrical Conductivity

The electrical conductivity supplied in the drip water will depend on the phase of growth, environmental conditions, crop performance, fruit load, varietal requirements etc.

The electrical conductivity of the drip water must be controlled by the grower. In hot weather, high light conditions, weak or highly generative growth use a lower electrical conductivity. With low light, cool weather, soft growth use a higher electrical conductivity.

In general, run off from the bags should be measured and recorded. Electrical conductivity readings of 2.5 to 4.5 dS/m in run off are acceptable under certain conditions. Avoid high and low electrical conductivity readings for extended periods unless conditions warrant them.

pH

The pH of the drip water should be applied at 5.5 to 6.5. The run off should be maintained at 5.8 to 6.5. If the pH is higher in the drip and run off, Phosphoric Acid 81% should be added to the B solution at 1.0 L and then the pH monitored in the drip water and run off solution. If pH is still high continue to add Phosphoric Acid 81% gradually until 2.0 L of acid is used, further additions will require modifications to the feed solution supplied to plants.

Future B solutions will need to be modified to reduce the total amount of phosphorus supplied with 2.0 L of Phosphoric Acid 81%. For 1.0 L of Phosphoric Acid 81%, remove 3.4 kg of Mono Potassium Phosphate and add 2.2 kg of Potassium Sulphate.

Never use more than 6.0 L of Phosphoric Acid 81%, seek further advice on long term pH management of the nutrient solution and run off.

Under rapid growth and nutrient uptake, the pH may rise. This can be regulated by the addition of Ammonium Nitrate, never use any more than 1.5 kg per 1,000 L extra unless analysis confirms suitability.

When modifying the pH and electrical conductivity, make gradual changes to achieve gradual changes to the growing media and root zone.