



HUMA GRO[®]

**MICRO CARBON TECHNOLOGY[®] IN HUMA
GRO[®] LIQUID FERTILIZERS NUTRITION...**

**MANUEL A. CAMPOS MACOSSAY
AGRONOMIC CONSULTANT
PH/CELL: +1 480-246-5469 +52-
9991-25-3923**

e-mail: manuel@bhn.us

WELCOME...

**BIO
HUMA
NETICS**
Incorporated

MCT ALL AROUND THE WORLD...

- WE WANT TO THANK ALL THE COUNTRIES THAT HAVE LET US BE INVOLVED WITH THE BEST "ELITE" OF THEIR TECHNICAL AND SALES DEVELOPMENT, IN THE FIELD WITH FARMERS, WHO ENCOURAGE THIS GREAT PROJECT WITH THE SATISFACTION OF GETTING INCREASED CROP YIELD, EFFICIENT WATER USE, IMPROVED SOIL AND MICROBIOLOGY...*

SPAIN

PERU

ECUADOR

COLOMBIA

USA

MEXICO

COSTA RICA

GUATEMALA

NICARAGUA

TURKEY

POLAND

MCT ALL AROUND THE WORLD...

- *WE HAVE BEEN ABLE TO WORK HARD IN THESE COUNTRIES OVER THE LAST 2 YEARS, ACHIEVING REMARKABLE SUCCESS AND OVERCOMING SOME DIFFICULTIES RESULTING FROM TAKING THIS TECHNOLOGY ALL OVER THE WORLD. HOWEVER, THE TRUTH IS THAT WE ARE GROWING TOGETHER THANKS TO THE GREAT AND ENDLESS TECHNICAL SUPPORT GIVEN TO US IN THE FIELDS, AND PERFORMING THOROUGH WORKS REGARDING GUIDING AND USEFUL FIELD PLANT NUTRITION, SUCH AS:*
- *MEASURING SAP IN EACH TREATED CROP, (ON SITE).*
- *IN THE SOILS, BY MAKING 2:1 SOIL EXTRACT SOLUTIONS.*
- *PHENOLOGY.*
- *NUTRITIONAL SOLUTION COLLECTING UNIT, IN DRIP EMITTERS.*
- *FOLLOW-UP OF FOLIAR AND COMPARATIVE SOIL ANALYSIS.*
- *PHYTOSANITARY TREATMENTS USING OUR PRODUCTS.*
- *POST-HARVEST RESULTS.*

MCT ALL AROUND THE WORLD...





MCT ALL AROUND THE WORLD...



MCT ALL AROUND THE WORLD...



MCT ALL AROUND THE WORLD...



MCT ALL AROUND THE WORLD...



MCT ALL AROUND THE WORLD...

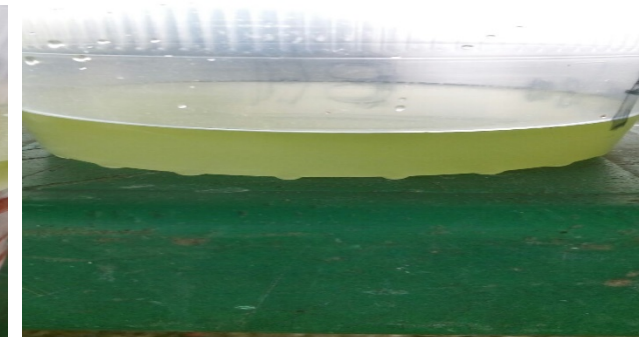
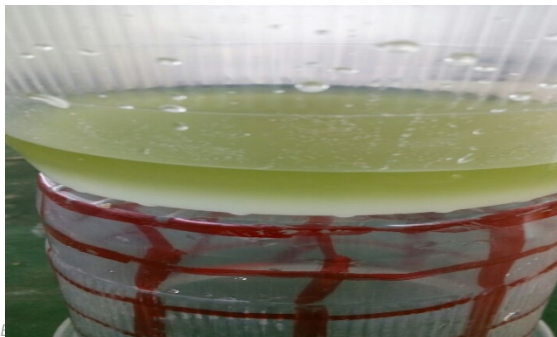
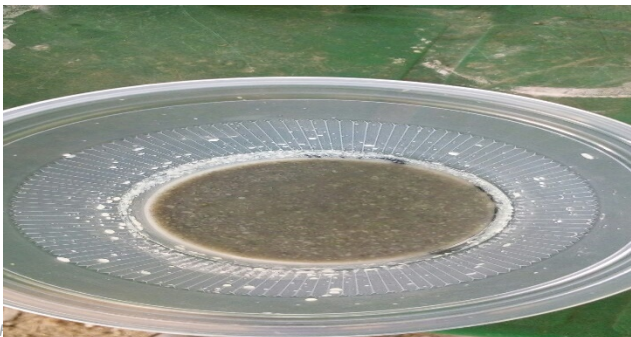


MCT ALL AROUND THE WORLD...

- *PROBLEMS OBSERVED DURING THE DEVELOPMENT OF THE TECHNOLOGY AND POSSIBLE SOLUTIONS:*
 - ❖ *WHEN PREPARING A COMPLETE NUTRITIONAL SOLUTION, THE MIX CURDLES IN THE STOCK SOLUTION TANKS*
 - ❖ *IN HUMA GRO LIQUID FERTILIZER MIXES FOR FOLIAR SPRAYING, ARE THE PRODUCTS STILL EFFECTIVE IF THEY CURDLE?*
 - ❖ *PRODUCTS CAN BE MIXED WITH CONVENTIONAL INSECTICIDES AND FUNGICIDES FORMING PRECIPITATES. IN THIS CASE, DO PESTICIDES LOSE THEIR EFFECT IF THEY CURDLE?*
 - ❖ *WILL DRIP EMITTERS GET BLOCKED?*
 - ❖ *WHY IS IT NOT NECESSARY TO ADD ACID TO LOWER THE IRRIGATION SOLUTION pH?*
 - ❖ *CAN IT BE USED IN HYDROPONIC SYSTEMS?*
 - ❖ *WHAT HAPPENS IF WE MIX IT WITH CONVENTIONAL FERTILIZERS?*
 - ❖ *IS THIS A SUPPLEMENTARY FERTILIZER OR CAN IT REPLACE THE ENTIRE FERTILIZATION OF A CROP?*
 - ❖ *HOW CAN WE SOLVE EACH OF THESE ISSUES?*

MCT ALL AROUND THE WORLD...

- *WHAT WE CAN DO:*
 - ❖ *WHEN PREPARING A COMPLETE NUTRITIONAL SOLUTION, THE MIX CURDLES IN THE STOCK SOLUTION TANKS*
 1. *REMEMBER THAT HUMA GRO FERTILIZERS CONTAIN ORGANIC ACIDS.*
 2. *ADD FERTILIZERS BASED ON THEIR PH, FROM THE MOST ALKALINE TO THE MOST ACID ONE.*
 3. *CONSIDER THE IONS PRESENT IN IRRIGATION WATER WHICH WILL CAUSE SOME REACTIVE EFFECT WITH MCT ORGANIC ACIDS.*
 4. *FLOATING ORGANIC SUBSTANCES IN WATERS USED FOR PREPARING STOCK SOLUTIONS ALSO REACT WITH FERTILIZERS.*
 5. *WE ONLY USE THE MOST SOLUBLE AND HIGH QUALITY FERTILIZING SOURCES AVAILABLE IN THE MARKET, IN THEIR BEST SOLUBILITY PERCENTAGE BECAUSE OF THEIR REACTION TO ORGANIC ACIDS USED IN MCT.*



MCT ALL AROUND THE WORLD...



MCT ALL AROUND THE WORLD...

- *POSSIBLE SOLUTIONS:*

- ❖ *IN HUMA GRO LIQUID FERTILIZER MIXES FOR FOLIAR SPRAYING, ARE THE PRODUCTS STILL EFFECTIVE IF THEY CURDLE?*
- ❖ *PRODUCTS CAN BE MIXED WITH CONVENTIONAL INSECTICIDES AND FUNGICIDES FORMING PRECIPITATES. IN THIS CASE, DO PESTICIDES LOSE THEIR EFFECT IF THEY CURDLE?*

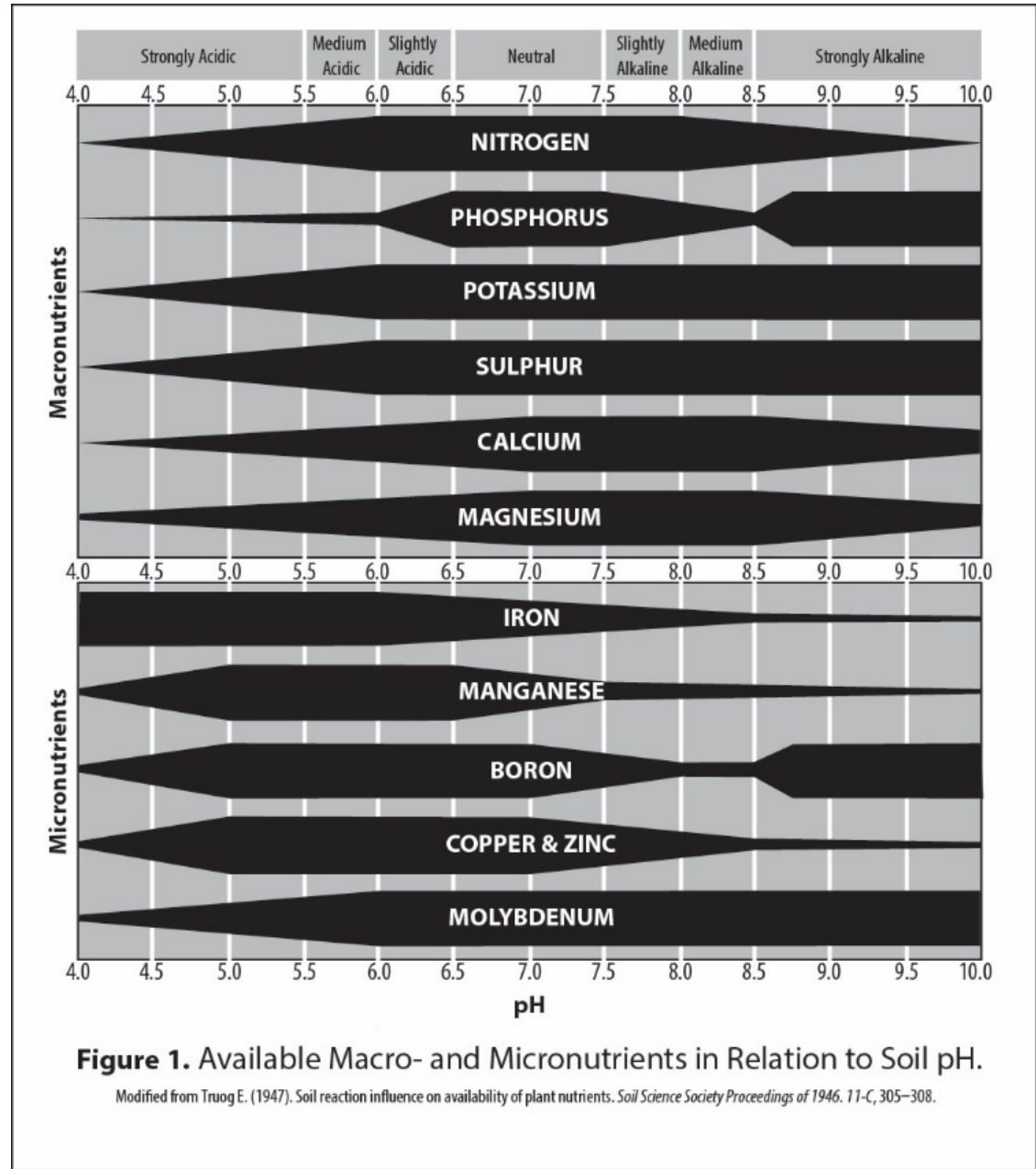
THEY DO NOT LOSE THEIR EFFECTIVENESS, IT IS JUST A pH EFFECT, SO THIS PROBLEM IS SOLVED OR MINIMIZED BY MIXING THEM BASED ON THEIR pH. CITRUS OR NITRIC ACIDS, WHICH ARE THE MOST COMMON ACIDS IN THE FIELD AND WHICH MOST FARMERS HAVE IN STOCK, MAY BE USED AND APPLIED IN DIFFERENT MANNERS.

FIRST, FOR NUTRITIONAL FOLIAR APPLICATIONS OR NUTRIENT ADJUSTMENTS, AS LOW DOSES ARE APPLIED, THE pH MUST ALWAYS BE TAKEN INTO ACCOUNT.

SECOND, MEASURE THE pH OF THE MOST SUITABLE APPLICATION FOR THE CROP, THEN MEASURE THE MOST SUITABLE pH FOR THE PESTICIDE IN FOLIAR APPLICATIONS AND PESTICIDE MIXTURES.

MCT ALL AROUND THE WORLD...

- *PROBLEMS OBSERVED DURING THE DEVELOPMENT OF THE TECHNOLOGY AND POSSIBLE SOLUTIONS:*
 - ❖ *WILL DRIP EMITTERS GET BLOCKED?*
 1. *DRIP EMITTERS GET BLOCKED BECAUSE THE IRRIGATION SYSTEM IS NOT WORKING AT THE SAME WORKING PRESSURE.*
 2. *THEY WON'T GET BLOCKED IF FERTILIZERS ARE MIXED BASED ON THEIR pH IN TANKS.*
 3. *IF ONLY ONE TANK IS USED, THE MIX MUST BE MADE BASED ON pH LEVELS; OTHERWISE, THERE WILL BE NO PROBLEM WITH CONCENTRATIONS FOR USE. IF POTASSIUM REACTS WITH DIRTY WATER CONTAINING FLOATING ORGANIC MATTER, CITRUS ACID CAN BE ADDED.*
 - ❖ *WHY IS IT NOT NECESSARY TO ADD ACID TO LOWER THE IRRIGATION SOLUTION pH?*
 1. *BECAUSE ALL HUMA GRO FERTILIZERS HAVE THEIR OWN STABILIZED pH TO BE COMPATIBLE AND MICRO-ENCAPSULATED WITH MCT.*
 2. *IF THE FARMER WANTS TO KEEP ITS SOLUTION pH, NITRIC ACID MUST BE ADDED TO THE IRRIGATION SOLUTION, WHICH IS ALSO CALCULATED IN THE NITROGEN INTAKE. THE AMOUNT OF NITRIC ACID TO BE USED TO BLOCK IRRIGATION WATER BICARBONATES AND GET A DOUBLE EFFECT MUST BE CONSIDERED.*



MCT ALL AROUND THE WORLD...

- *PROBLEMS OBSERVED DURING THE DEVELOPMENT OF THE TECHNOLOGY AND POSSIBLE SOLUTIONS:*

- ❖ *CAN IT BE USED IN HYDROPONIC SYSTEMS?*

1. *YES, IT CAN BE USED FOR CROPS AND HYDROPONIC SYSTEMS, FROM ORGANIC SUBSTRATES (COCONUT FIBER, RICE HUSK, VOLCANIC STONES, ETC.), INERT SUBSTRATES (PERLITES, STONE WOOL, PEAT FOAM, ETC.) TO CROPS IN RECIRCULATING AND POND SOLUTIONS.*
2. *ADD NITRIC ACID TO REDUCE BICARBONATES, LEAVING 0,5 meq/L FOR BUFFER EFFECT, CALCULATE MICROELEMENTS AT 80% OF A CONVENTIONAL EQUIVALENT FERTILIZER, AND ADD X'TEND "B" TO REINFORCE THE NUTRITIONAL SOLUTION.*
3. *IT ALLOWS US TO OBTAIN 400 AND 500 TIMES MORE CONCENTRATED SOLUTIONS.*



SOILLESS SYSTEM - PLANT



SOILLESS SYSTEM - PLANT



SOILLESS SYSTEM - PLANT



SOILLESS SYSTEM - PLANT



MCT ALL AROUND THE WORLD...

- *PROBLEMS OBSERVED DURING THE DEVELOPMENT OF THE TECHNOLOGY AND POSSIBLE SOLUTIONS:*

- ❖ *WHAT HAPPENS IF WE MIX IT WITH CONVENTIONAL FERTILIZERS?*

1. *FOR FARMERS IRRIGATING ONCE OR TWICE A WEEK WITH WATER ONLY, THE PRODUCT CAN BE MIXED WITH CONVENTIONAL FERTILIZERS TO PROVIDE A MINIMUM DILUTION SUSTAINABILITY BASE TO THE FERTILIZER PRESENT IN THE SOIL SOLUTION, AS THE FARMER WANTS TO GET IMMEDIATE RESULTS.*
2. *MORE CONCENTRATED SOLUTIONS CAN BE PREPARED BASED ON THE FARMER'S NEEDS, HOWEVER, COST CONCERNS SEEM TO PREVAIL OVER THE GREAT EFFICIENCY BENEFITS OFFERED BY THIS TECHNOLOGY.*

- ❖ *IS THIS A SUPPLEMENTARY FERTILIZER OR CAN IT REPLACE THE ENTIRE FERTILIZATION OF A CROP?*

1. *AS THIS IS NOT A SUPPLEMENTARY FERTILIZER, IT CAN REPLACE THE ENTIRE FERTILIZATION. WE CAN PREPARE TAILOR-MADE SOLUTIONS FOR EACH FARMER, CONSIDERING FIRST THE IRRIGATION METHOD USED SO AS TO PROVIDE A SUITABLE FERTILIZATION.*
2. *FARMERS USUALLY WANT TO SEE EC IN THE SOLUTION, THAT'S WHY THEY GET DISCOURAGED. SO WE CAN IMPLEMENT NUTRITION BY INJECTING HUMA GRO CONCENTRATED LIQUID FERTILIZERS IN A MAJOR PART OF THE IRRIGATION.*
3. *IF EC-DRIVEN FERTIRRIGATION MACHINES ARE USED WITHOUT VOLUME-BASED INJECTION, MIXES SHOULD BE PREPARED AS SPECIFIED ABOVE, OTHERWISE, THEY WILL BE INJECTED BASED ON VOLUME.*

Size **DOES MATTER** < EC...

Humic acid
1,000s of
carbon rings

Molecular mass:
30,000 to 100,000

CEC: 500 - 800

Fulvic acid
100s of
carbon rings

Molecular mass:
3,000 to 10,000

CEC: 800 - 1500



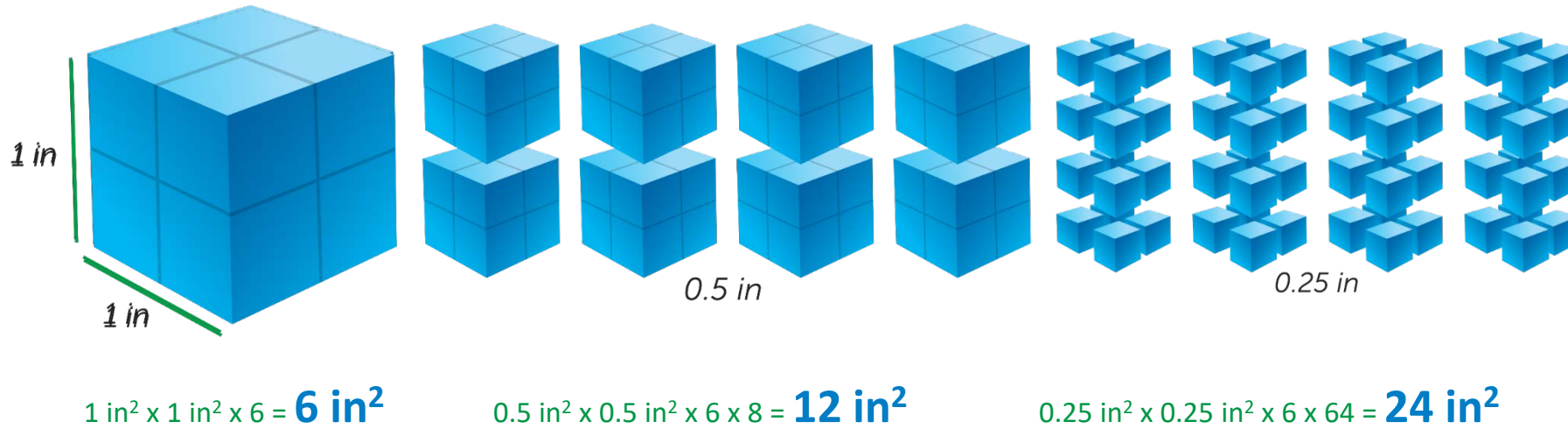
Micro Carbon Technology®
1 to 6 carbon rings

Molecular mass: > 500

CEC 2500
meq/100 gr

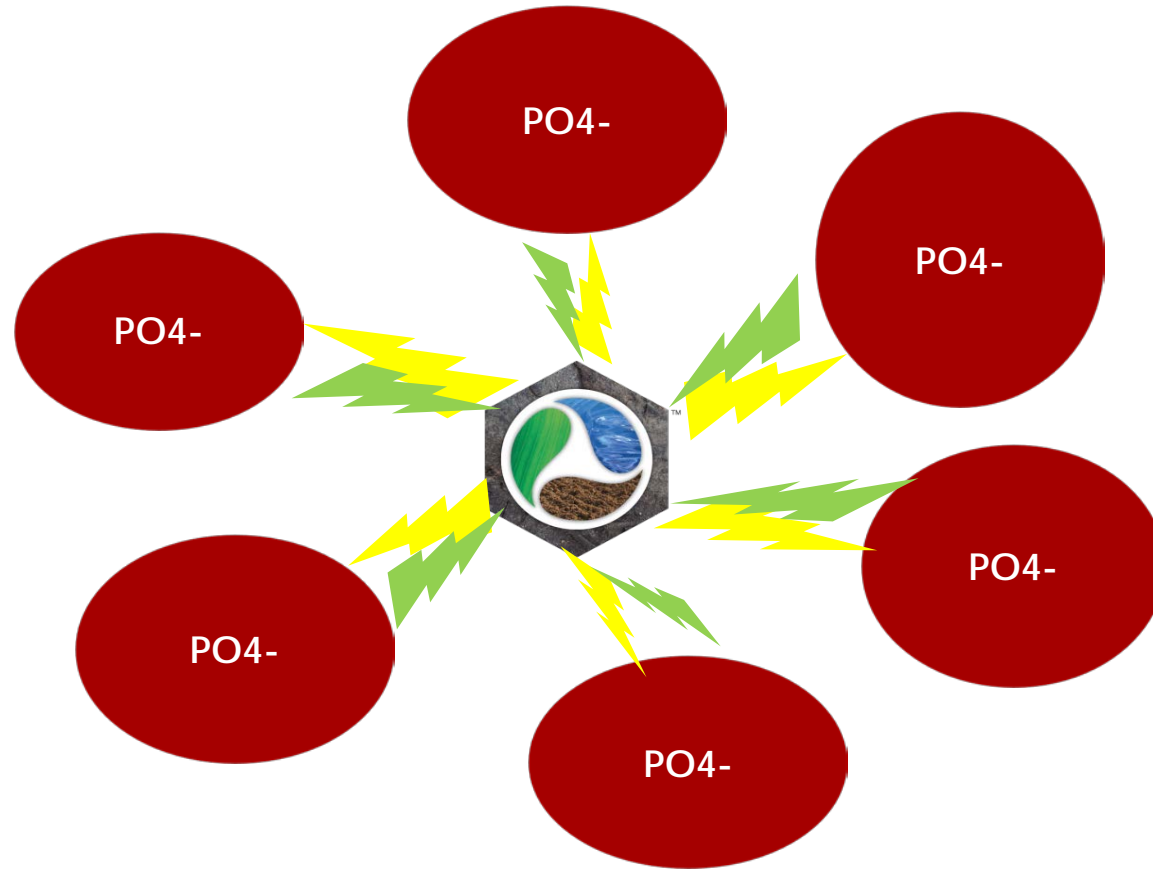
**WE ALREADY HAVE THE
COCA-COLA-LIKE SYRUP
FOR AGRICULTURE, WE GO
FOR THE COCA COLA
NOW!!!**

MCT PROVIDES LARGER CAPTURE AND ION EXPOSURE SURFACE TO ROOTS

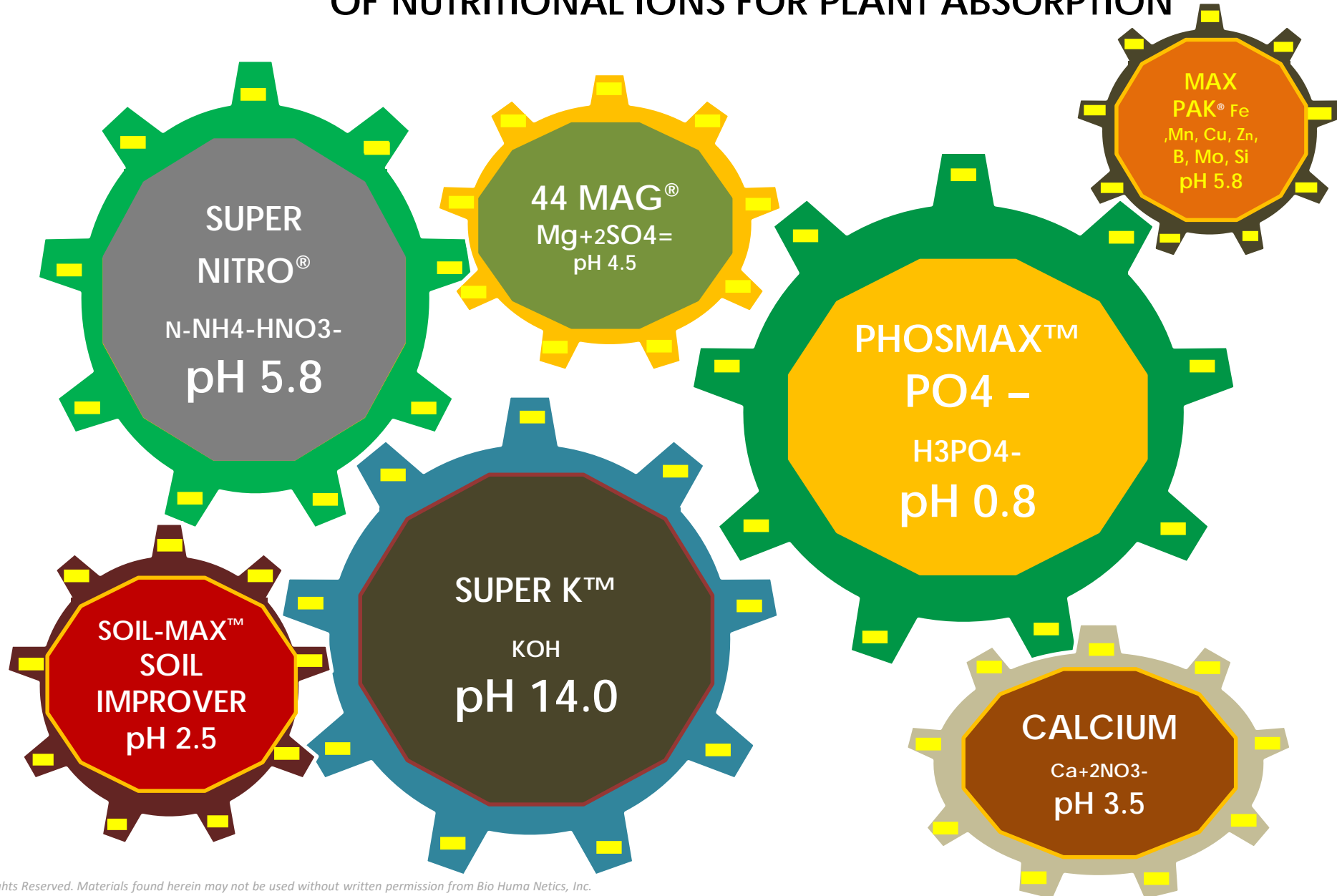


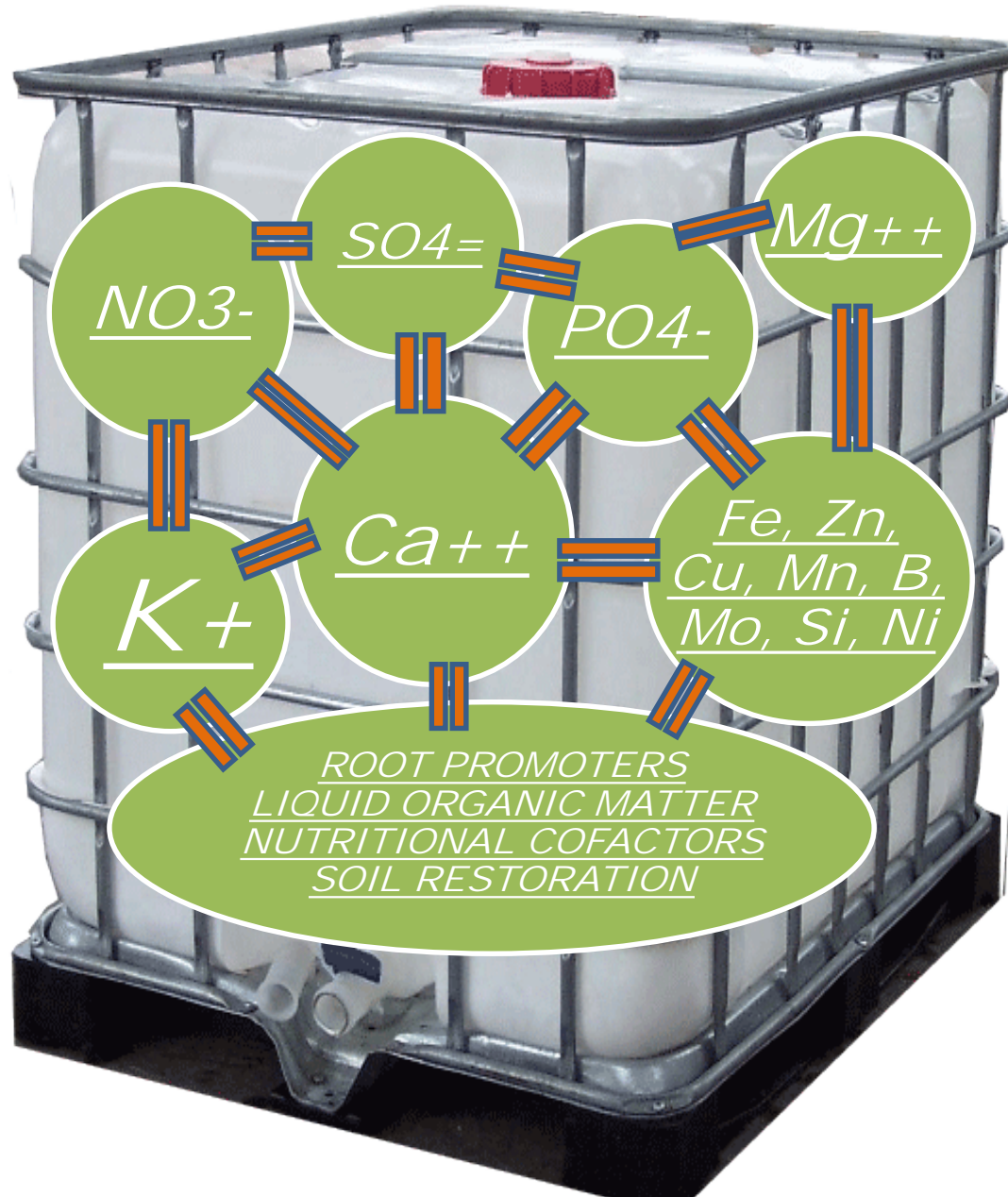
LARGER SURFACE AREA COVERED = ULTRA HIGH EFFICIENCY!

MCT ACTION...



MCT COMPLEXING CONCEPT AND AVAILABILITY OF NUTRITIONAL IONS FOR PLANT ABSORPTION



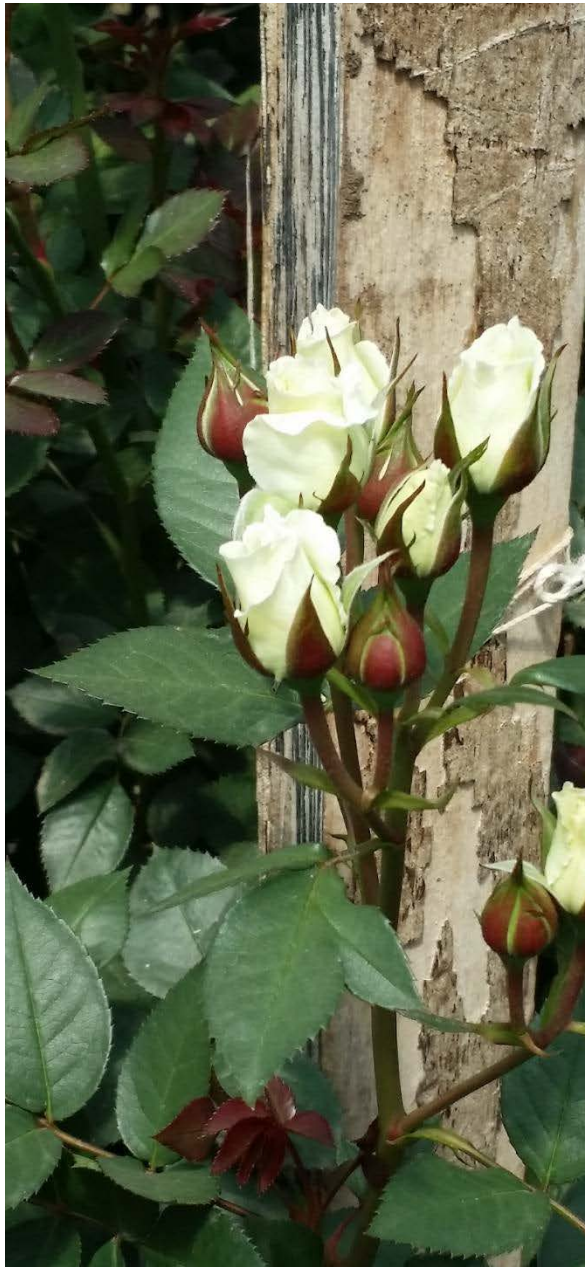


*MORE
PRACTICAL*

*ALL THE
TECHNOLOGY
IN ONLY 1
TANK*

X-TEND[®] B ACTIONS IN UREA IMPREGNATED SOIL





DOING MORE WITH LESS...

ALL EFFORTS COUNT +

MONITORING



Download from
Dreamstime.com



PREPARATION OF NUTRITIONAL AND FERTILIZATION SOLUTIONS...

- PRACTICAL DEFINITION: NUTRIENT DISSOLUTION THAT MEETS FOUR REQUIREMENTS WHEN USED.
 - ✓ Presence of all nutritional ions needed by the plant.
 - ✓ Synergic relationship between ions, thus avoiding initial antagonisms.
 - ✓ Saline concentration is known and quantified in Electrical Conductivity units (EC).
 - ✓ Necessary pH level for optimizing ion capture by the plant.

FERTIGATION IN HIGH VALUE CROPS...

- FOR FERTIGATION IN HIGH VALUE CROPS, IT IS IMPORTANT TO KNOW THE NUTRITIONAL DEMAND OF THE VARIETY SO AS TO PREPARE A TAILOR-MADE PERFECT NUTRITION.
- THIS MEANS THAT WITH MCT, OUR PREPARATIONS WILL BE MADE ACCORDING TO THE DEMAND OF N-P-K-Ca-Mg EXPRESSED IN THEIR CORRESPONDING UNITS, AS WE CAN FULLY REPLACE AND ADAPT IT TO THE FARMER'S FERTILIZATION HABITS: FREQUENT, NON-FREQUENT AND FOLIAR IRRIGATION.
- *THE POINT IS TO DEVELOP THE CROP PHENOLOGY IN THE AREA TO DRAFT THE APPROPRIATE NUTRITIONAL PLAN CONSIDERING SOIL IMPROVERS, SOIL MICROORGANISM ACTIVATION, AND AVOIDING ANTAGONISMS WITH ADDED NUTRIENTS.*
- *THE USE OF NUTRITIONAL DISSOLUTIONS BASED ON PLANT EXTRACTIONS FITS THE CROP NEEDS BETTER THAN STANDARD DISSOLUTIONS. THIS AVOIDS IMBALANCES (DEFICIENCIES AND TOXICITIES) AND IMPROVES THE ECONOMIC EFFICIENCY.*
- *ABSORPTION CURVE DATA IS USEFUL IN TERMS OF SPECIFIC PERFORMANCE, SINCE NUTRITIONAL NEEDS CHANGE DEPENDING ON THE CROP YIELD.*

EXAMPLE OF CALCULATION OF AN IDEAL SOLUTION IN DISTILLED WATER...

IONS	NO3-	PO4-	SO4=	K+	Ca++	Mg++	TRACES	ROOT PROMOTER	pH	EC
SUH	12	2	4.5	7	9	4.5	2 ppm Fe	10 ml/cubic m	5.8	2.0

PRODUCT	INPUT (meq/L)	AMOUNT OF FERTILIZER APPLIED	pH	E.C ms/cm
SUPER NITRO	3	48 ml	6.25	0.35
PHOSMAX	2	20 ml		
SUPER K	7	45.5 ml		
CALCIUM	9	108 ml		
44-MAG	4.5	54		
MAXPAK	2 ppm Fe	15 ml		
BREAKOUT	10 ml/cubic m	10 ml		

TRUE GREAT PROFITS...

- *THE IRRIGATION METHOD IS ESSENTIAL TO BE ABLE TO OBTAIN GREAT PROFITS WITH LIQUID HUMA GRO® FERTILIZERS BASED ON A PROPER CALCULATION FORMULA OF THE DIFFERENT NUTRITIONAL SOLUTIONS.*
- *TODAY NUTRITION IMPLIES NOT ONLY PROVIDING NUTRIENTS BUT ALSO TAKING CARE OF SOILS, ACTIVATING BENEFICIAL MICROORGANISMS, ADDING LIQUID ORGANIC MATTER, FOOD FOR BENEFICIAL BACTERIA, AND DISEASE-RESISTANCE INDUCERS TO BENEFIT CROPS.*
- *AS IRRIGATION IS IMPROVED (WORKING PRESSURE, FREQUENCY, AND AMOUNT), SO ARE THE GREAT PROFITS OBTAINED WITH OUR TECHNOLOGY:*
 - *LESS WATER CONSUMED THROUGHTOUT THE WHOLE CROP CYCLE.*
 - *HIGHER SOIL OXYGENATION.*
 - *LARGER AMOUNT OF USEFUL WATER IN SOILS DUE TO THE LOW SOIL SOLUTION EC.*
 - *FEWER PATHOGENS THANKS TO SOIL IMPROVERS.*
 - *ACTIVATION OF NATURAL SOIL MICROBIOTA AND IMPROVED MICROBIOLOGICAL FIGHT AGAINST PATHOGENS.*
 - *ACTIVATION OF FACULTATIVE AND NUTRIENT-FIXING BACTERIA.*

WATER AVAILABILITY BASED ON EC

Water Available for Use

Water Not Fit for Use



*LOW
EC*



*MODERATE
EC*



*HIGH
EC*

NUTRITIONAL SOLUTION EQUIVALENT DOSE PER ION AND ELEMENTS TO BE CALCULATED...

PRODUCT	INPUT EQUIVALENCE (meq/L)		DOSE cubic m/meq/L	UNITS OF EQUIVALENT INPUT
SUPER NITRO®	NO3-	1	20	1 L = 2.0
PHOS MAX™	PO4-	1	10	1 L = 8.0
SUPER K™	K+	1	7	1 L = 5.0
44-MAG®	Mg++	1	12	1 L = 4.0
CALCIUM	Ca++	1	14	1 L = 4.0
MICROELEMENT EQUIVALENCES FOR FERTIGATION...				
MAX PAK®	1.8 PPM (Fe)		9.33 ml	
IRON	Fe (MARKET)		2/1	
MANGANESE	Mn (MARKET)		2/1	
BORON	B (MARKET)		2/1	
MOLYBDENUM	Mo (MARKET)		3/1	
COPPER	Cu (MARKET)		3/1	
SILI-MAX®	Si (MARKET)		3/1	

THE GLOBAL COMMITMENT OF OUR COMPANY IN TERMS OF WATER CARE, SOIL IMPROVEMENT AND PRESERVATION, AND BALANCE OF SOIL MICROORGANISMS AIMS AT MAINTAINING THE PERMACULTURE AND TECHNICAL AND COMMERCIAL HONESTY...

CALCIUM applied in the irrigation water, kg/ha

Calcium in water (meq/L)	IRRIGATION VOLUME, cubic m/ha PER DAY...			
	10	20	30	40
	SOIL-APPLIED CALCIUM, kg/ha PER DAY			
1.0	0.2	0.4	0.6	0.8
3.0	0.6	1.2	1.8	2.4
6.0	1.2	2.4	3.6	4.8
9.0	1.8	3.6	5.4	7.2

TOMATO NUTRITIONAL EXTRACTION FOR PRODUCING 1 TON OF FRUIT.		
NUTRIENT	kg/Tm	TOTAL EXTRACTION IN kg/ha
Calcium	2.3	690

Example of CALCIUM applied in the irrigation water, kg/ha

- *2 meq/L of Calcium in the irrigation water in 1 cubic m of irrigation water.*
- *Therefore, 2×20 (p. eq) = 40/1,000 L of water = 0.04 kg of Calcium ion/cubic m of irrigation water \times 20 cubic m of irrigation to provide 0.8 kg in the irrigation scheduled for the day.*

EQUIVALENT NUTRIENT CONSIDERATION WHEN DECIDING ON ION INPUT THROUGH IRRIGATION WATER...

MAGNESIUM applied in the irrigation water, kg/ha

Magnesium in water (meq/L)	IRRIGATION VOLUME, cubic m/ha PER DAY...			
	10	20	30	40
	SOIL-APPLIED MAGNESIUM, KG/ha PER DAY			
1.0	0.1	0.2	0.4	0.5
3.0	0.4	0.7	1.1	1.4
6.0	0.7	1.4	2.2	2.9
9.0	1.1	2.2	3.2	4.3

TOMATO NUTRITIONAL EXTRACTION FOR PRODUCING 1 TON OF FRUIT.		
NUTRIENT	kg/Tm	TOTAL EXTRACTION IN kg/ha
Magnesium	0.4	120

HIDDEN IRRIGATION WATER SAVINGS NOT TAKEN INTO ACCOUNT...

K in water --me/L--	Irrigation volume, cubic m/ha per day			
	10	20	30	40
	Soil-applied potassium, kg/ha per day			
0.5	0.2	0.4	0.6	0.8
1.0	0.4	0.8	1.2	1.6
1.5	0.6	1.2	1.8	2.3
2.0	0.8	1.6	2.3	3.1

HIDDEN IRRIGATION WATER SAVINGS NOT TAKEN INTO ACCOUNT...

N-NO ₃ in water --me/L--	Irrigation volume, cubic m/ha per day			
	10	20	30	40
	Soil-applied N-NO ₃ , kg/ha per day			
0.5	0.07	0.14	0.21	0.28
1.0	0.14	0.28	0.42	0.56
1.5	0.21	0.42	0.63	0.84
2.0	0.28	0.56	0.84	1.12

HIDDEN IRRIGATION WATER SAVINGS NOT TAKEN INTO ACCOUNT...

NO ₃ in water --me/L--	Irrigation volume, cubic m/ha per day			
	10	20	30	40
	Soil-applied NO ₃ , kg/ha per day			
0.5	0.3	0.6	0.9	1.2
1.0	0.6	1.2	1.7	2.5
1.5	0.9	1.7	2.8	3.7
2.0	1.2	2.5	3.7	4.9

THANK YOU FOR YOUR ATTENTION...

E-MAIL: manuel@bhn.us



**TECNOLOGÍA
MICRO CARBONO™**

