GROWING BEYOND WITH REDOX

AgRx 2017 Citrus and Avocado Meeting

Redox

WHO IS REDOX?

Redox is a specialty nutrient company that focuses on innovative plant growth technology.

WHAT DOES REDOX DO?

Redox incorporates eleven distinct types of soluble carbon chemistries with plant nutrients to dramatically improve plant uptake, input efficiency and results.

1. Calcium-Oxygen Compounds
2. Fulvic Acid
3. Humic Acid
4. Long Chain Carbon Complex
5. Micro-encapsulation Surfactant
6. VMC Surfactant
7. Black walnut extract
8. Willow extract
9. Fermentation Extract Mannitol
10. L-Amino Acids
11. Carboxylic Acid

Redox


Phosphorus
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THE SCIENCE

PHOSPHORUS

Optimum phosphorus is associated with quality and quantity of the root system

- Natural soil chemistry conditions quickly tie up conventional phosphorus
- Conventional phosphate is often applied in excess to make up for this

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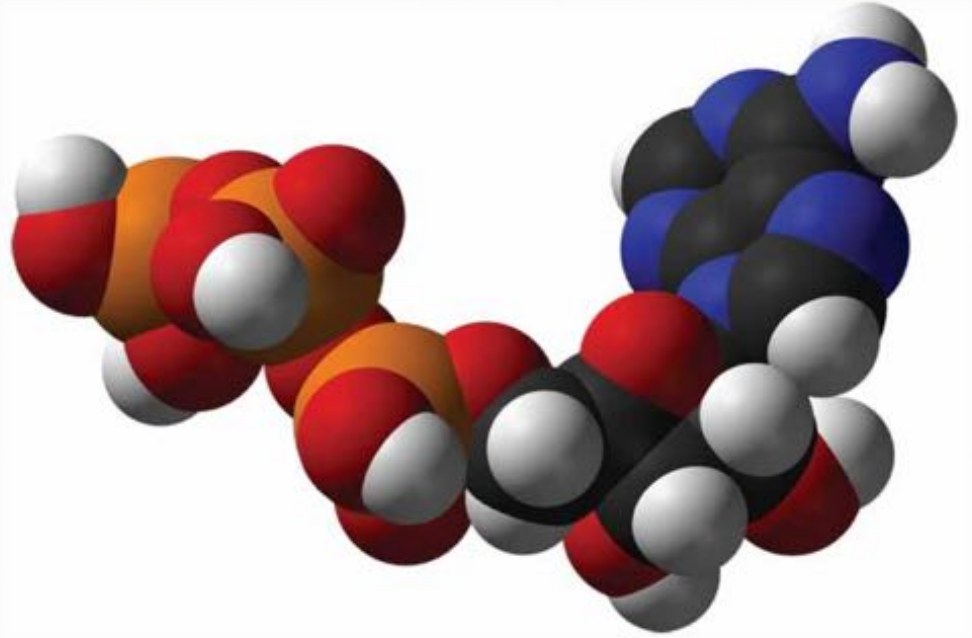
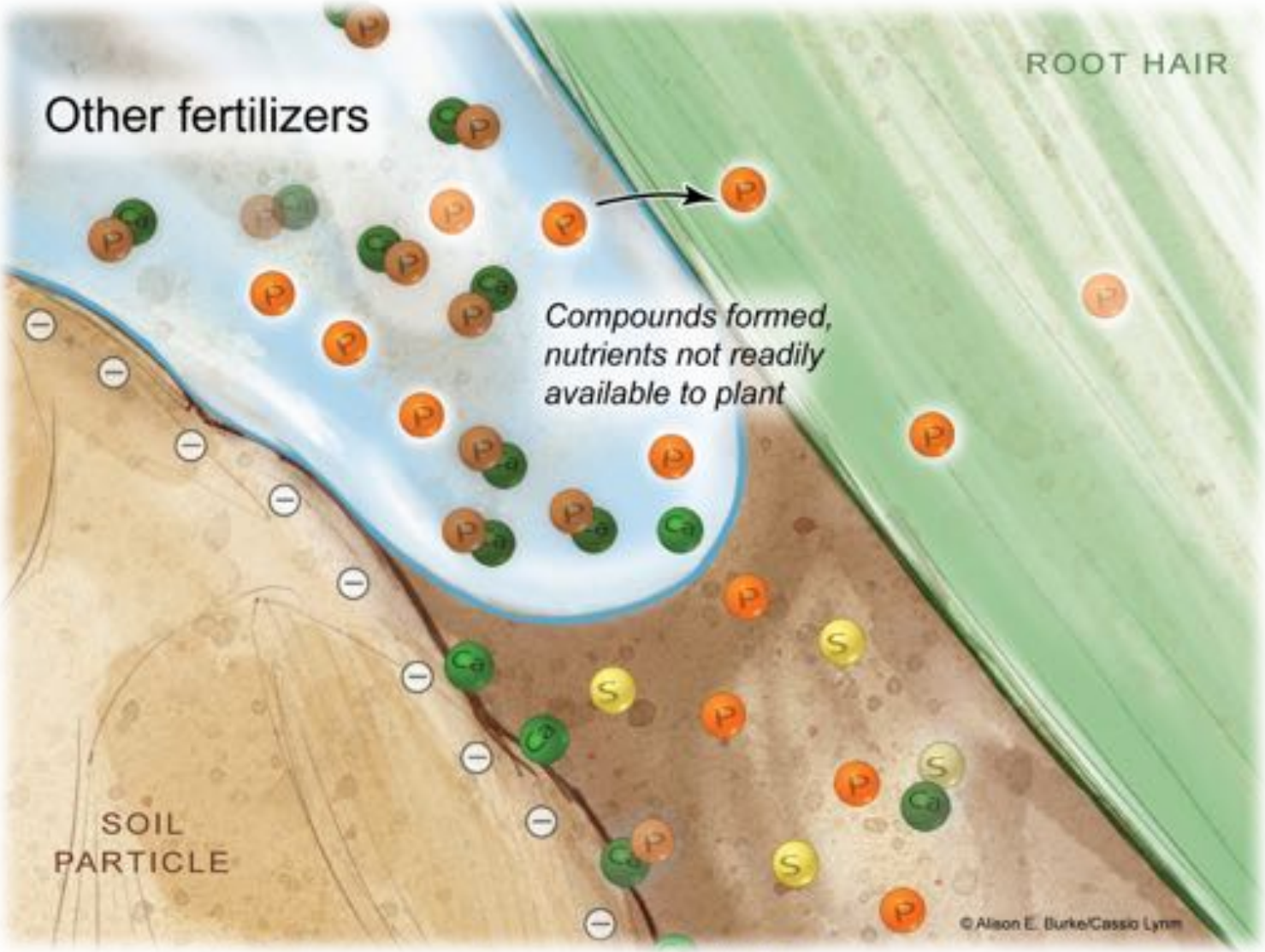
PHOSPHORUS

- THE ENERGY MOLECULE OF THE PLANT




Other fertilizers
ROOT HAIR
Compounds formed,
nutrients not readily
available to plant
SOIL
PARTICLE
© Alison E. Burke/Cassio Lynm

Redox

08/18/2016

PERFORMANCE AGRICULTURE 15

CEC: 34.9 | % ORGANIC MATTER: 4.1 | PH: 6.5
SOIL SOLUTION WEIGHT: 211,805 | SOLUBLE SALTS - EC: 0.4

Redox

REPORT SUMMARY

	CHEMICAL EXTRACTION (SOIL PPM)	PASTE EXTRACTION (SOLUTION PPM)	PERCENT BASE SATURATION
CALCIUM	4,259.00 (mod. low)	36.48 (very low)	61.01% (mod. low)
MAGNESIUM	998.10 (high)	12.80 (very low)	23.83% (high)
POTASSIUM	290.80 (low)	8.03 (very low)	2.13% (low)
SODIUM	50.13 (ok)	17.43 (high)	0.62% (ok)
PHOSPHORUS	156.60 (very high)	0.44 (very low)	
SULFUR	57.92 (ok)	27.88 (moderate)	
MANGANESE	70.76 (high)	0.01 (low)	
COPPER	4.16 (ok)	0.01 (very low)	
ZINC	9.04 (high)	0.01 (very low)	
IRON	107.30 (high)	0.68 (ok)	
BICARBONATE		61.00 (low)	
CHLORIDE		60.00 (moderate)	
BORON	0.66 (low)	0.09 (very low)	
HYDROGEN			7.50% (moderate)

KEY OPPORTUNITIES

- Optimum Soluble Potassium
- Optimum Soluble Magnesium
- Base Saturation Potassium
- Optimum Soluble Calcium
- Soluble Phosphorus

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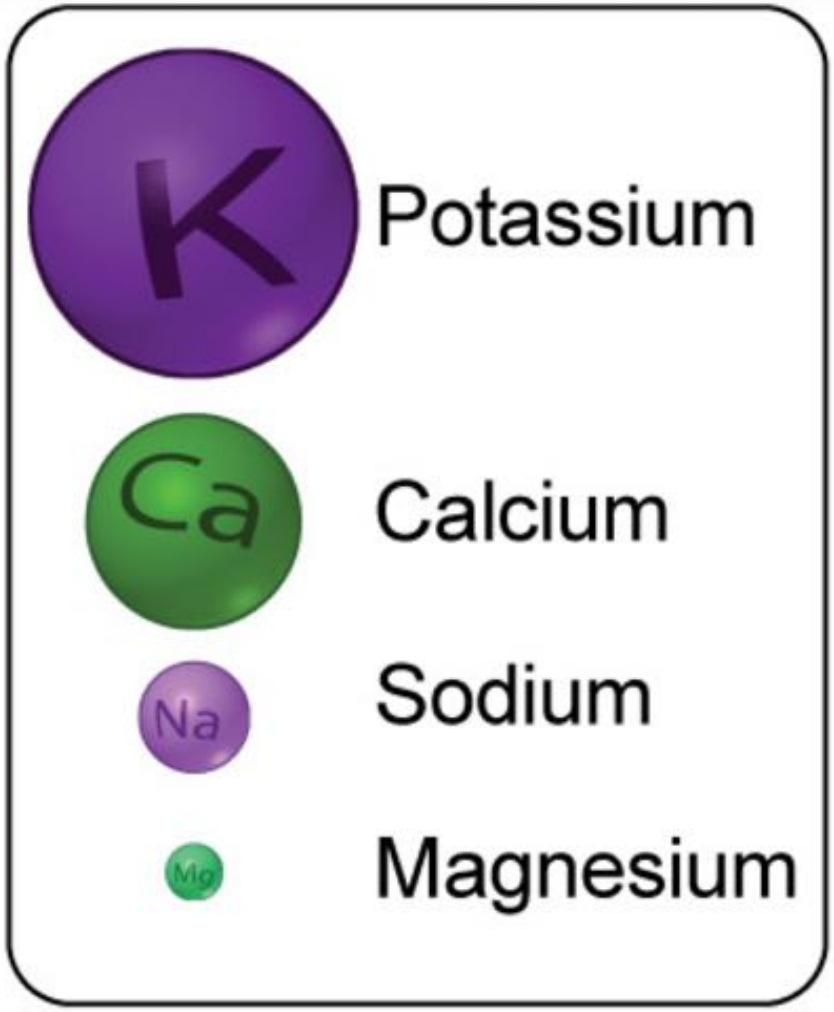
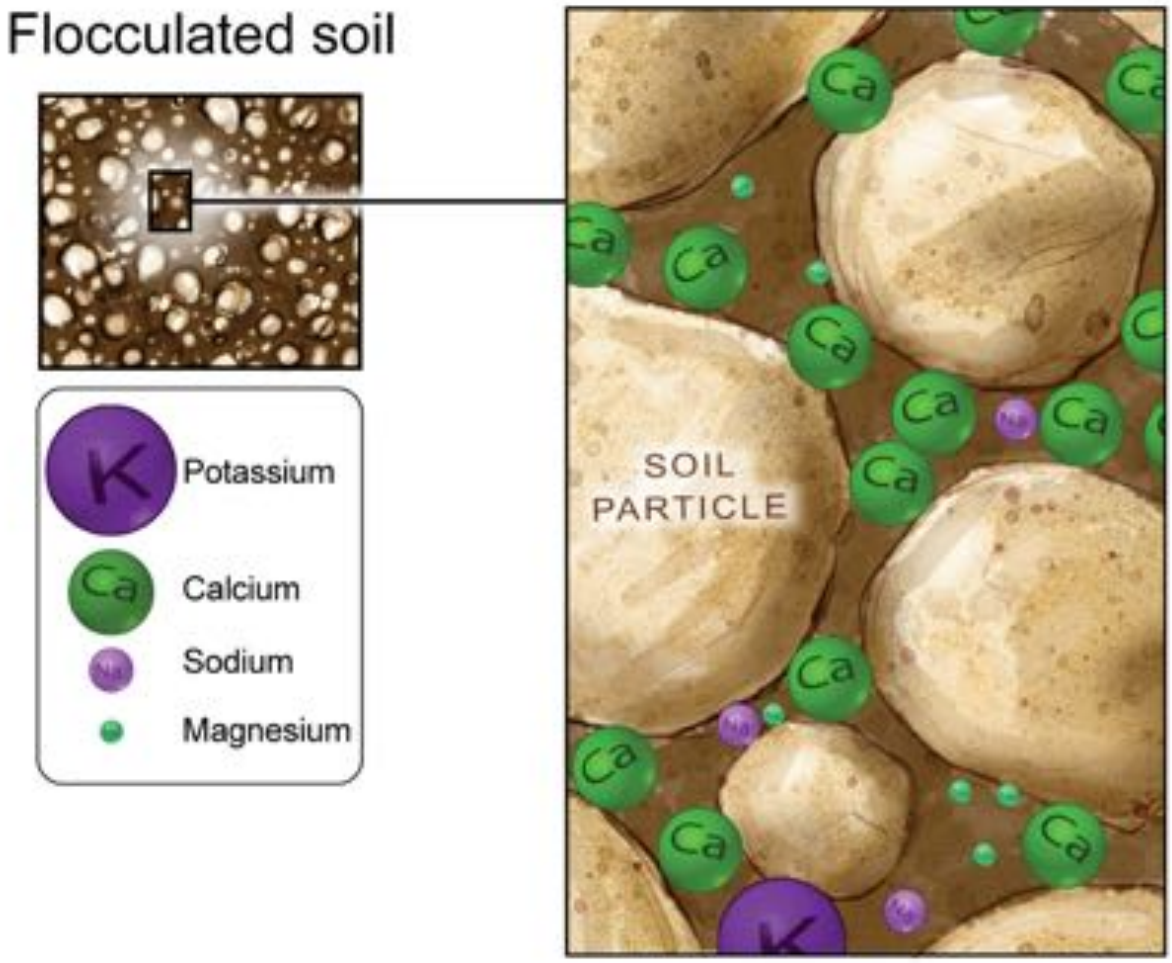
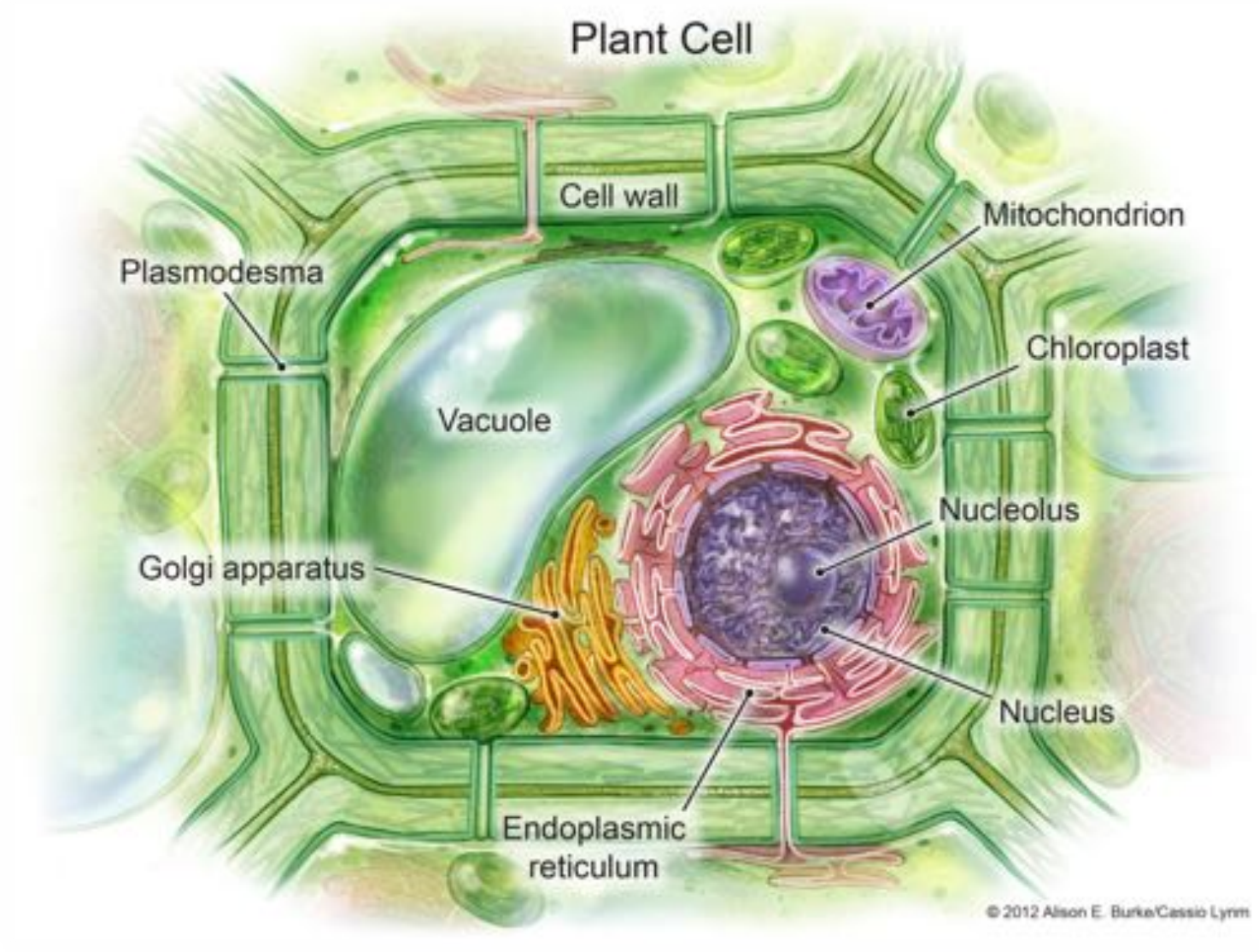
Calcium
Redox

CALCIUM

- SOIL STRUCTURE
- CELL WALL INTEGRITY & STRENGTH
- ROOT GROWTH




Flocculated soil
Potassium
Calcium
Sodium
Magnesium
SOIL PARTICLE
© Alison E. Burke/Cassio Lynm


Plant Cell
Cell wall
Mitochondrion
Plasmodesma
Chloroplast
Vacuole
Nucleolus
Golgi apparatus
Nucleus
Endoplasmic
reticulum
© 2012 Alison E. Burke/Cassio Lynm

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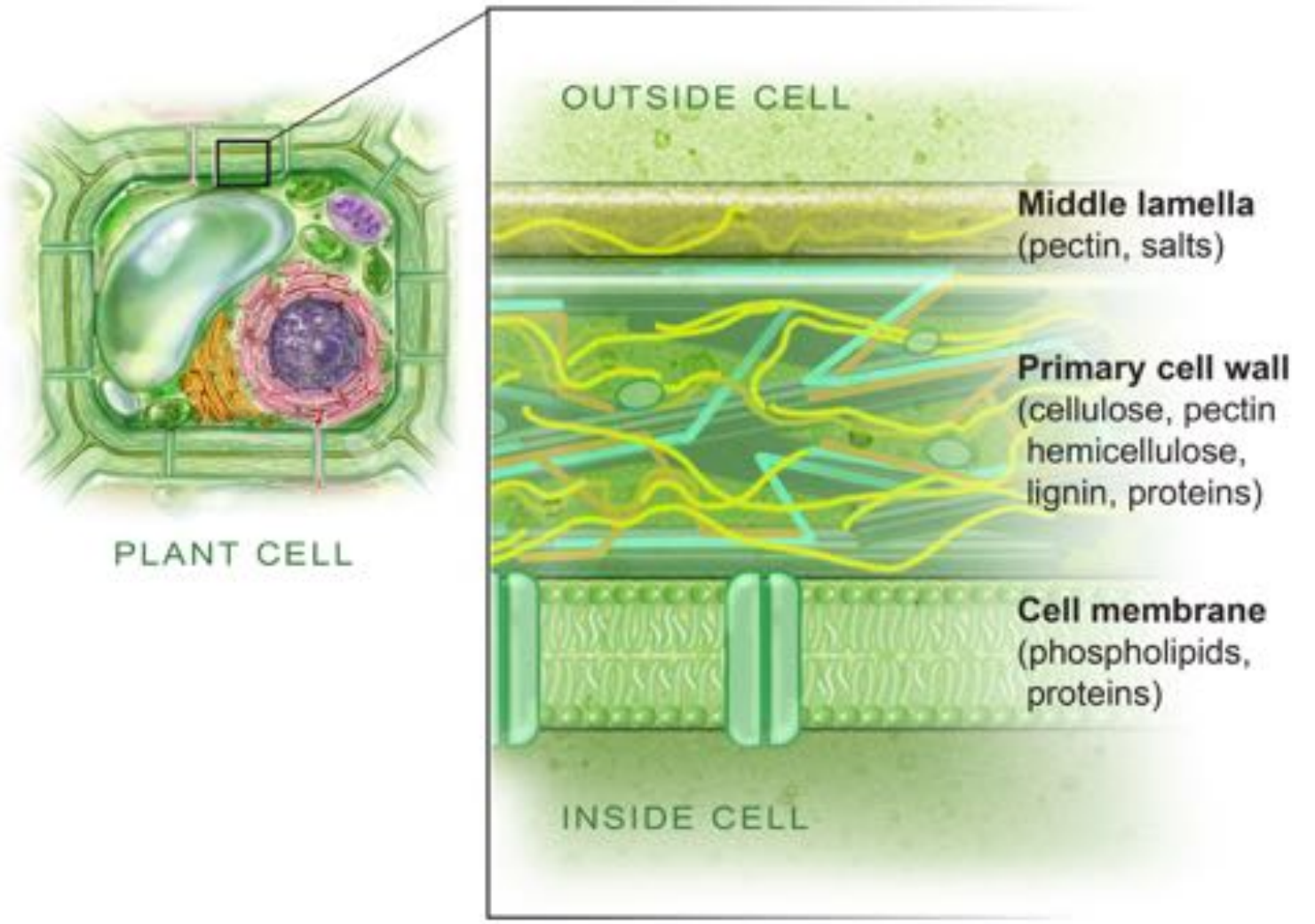
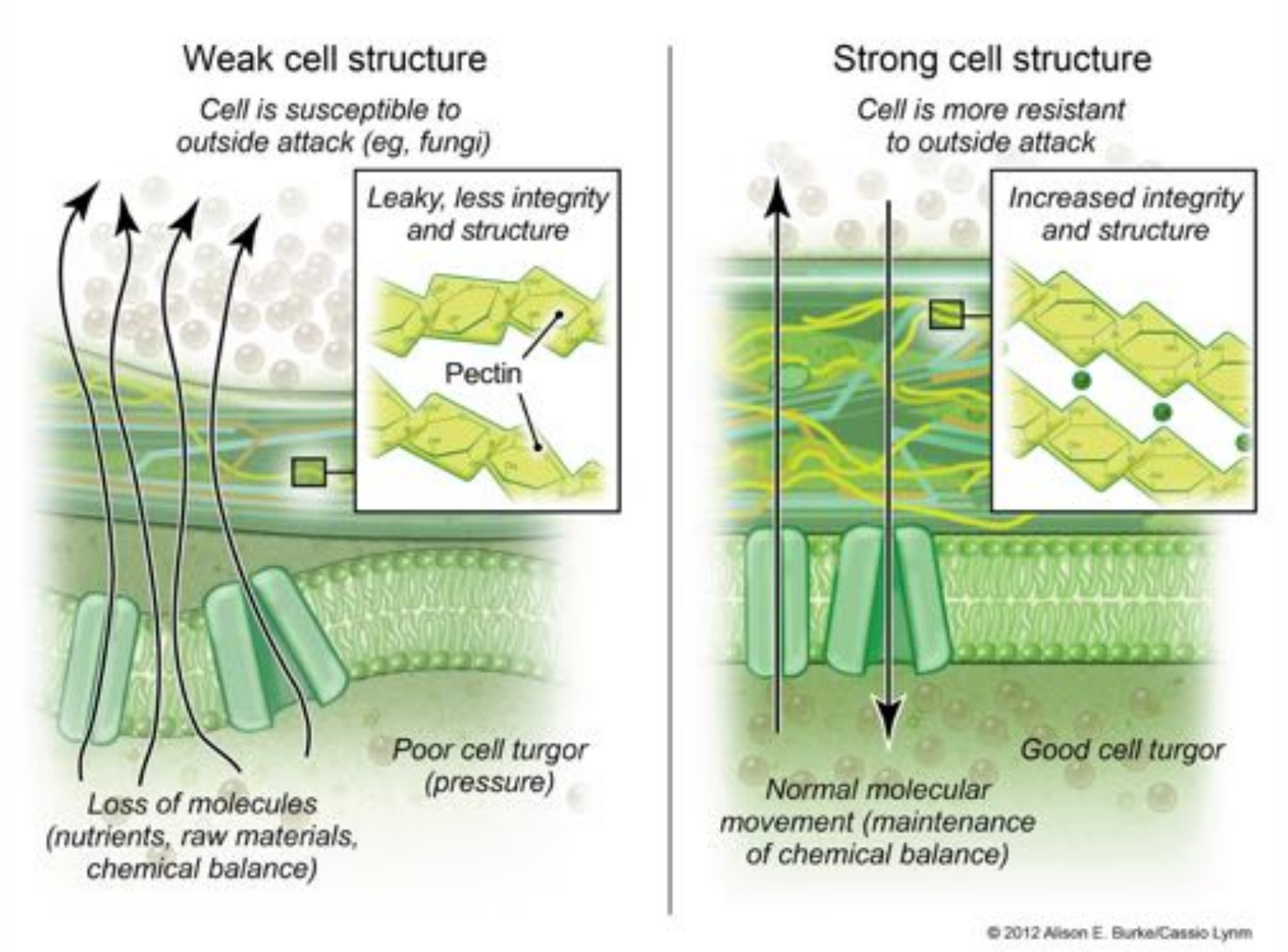
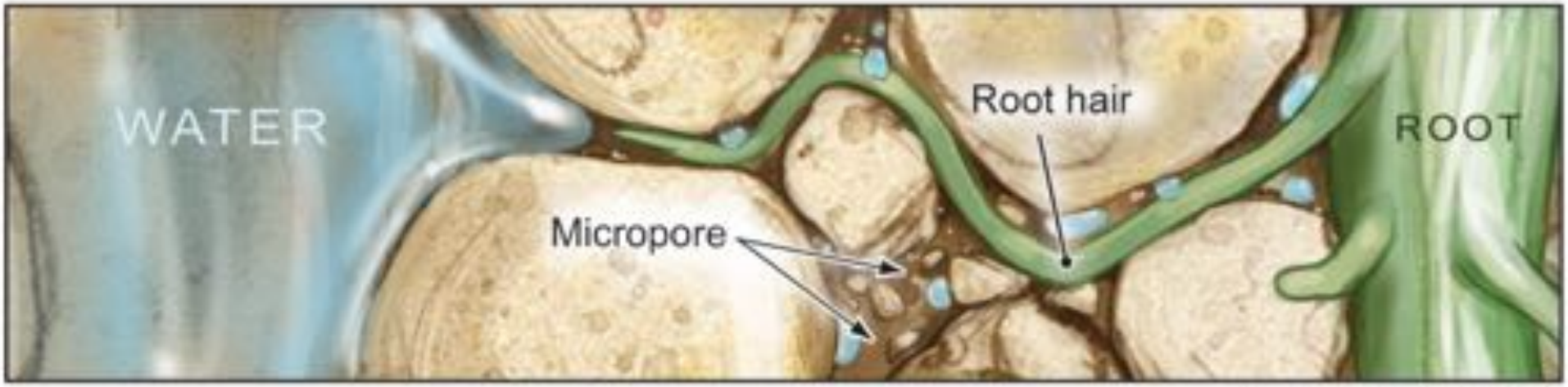



Weak cell structure
Cell is susceptible to outside attack (eg, fungi)
Leaky, less integrity and structure
Pectin
Poor cell turgor (pressure)
Loss of molecules (nutrients, raw materials, chemical balance)
Strong cell structure
Cell is more resistant to outside attack
Increased integrity and structure
Good cell turgor
Normal molecular movement (maintenance of chemical balance)
© 2012 Alison E. Burke/Cassio Lynm



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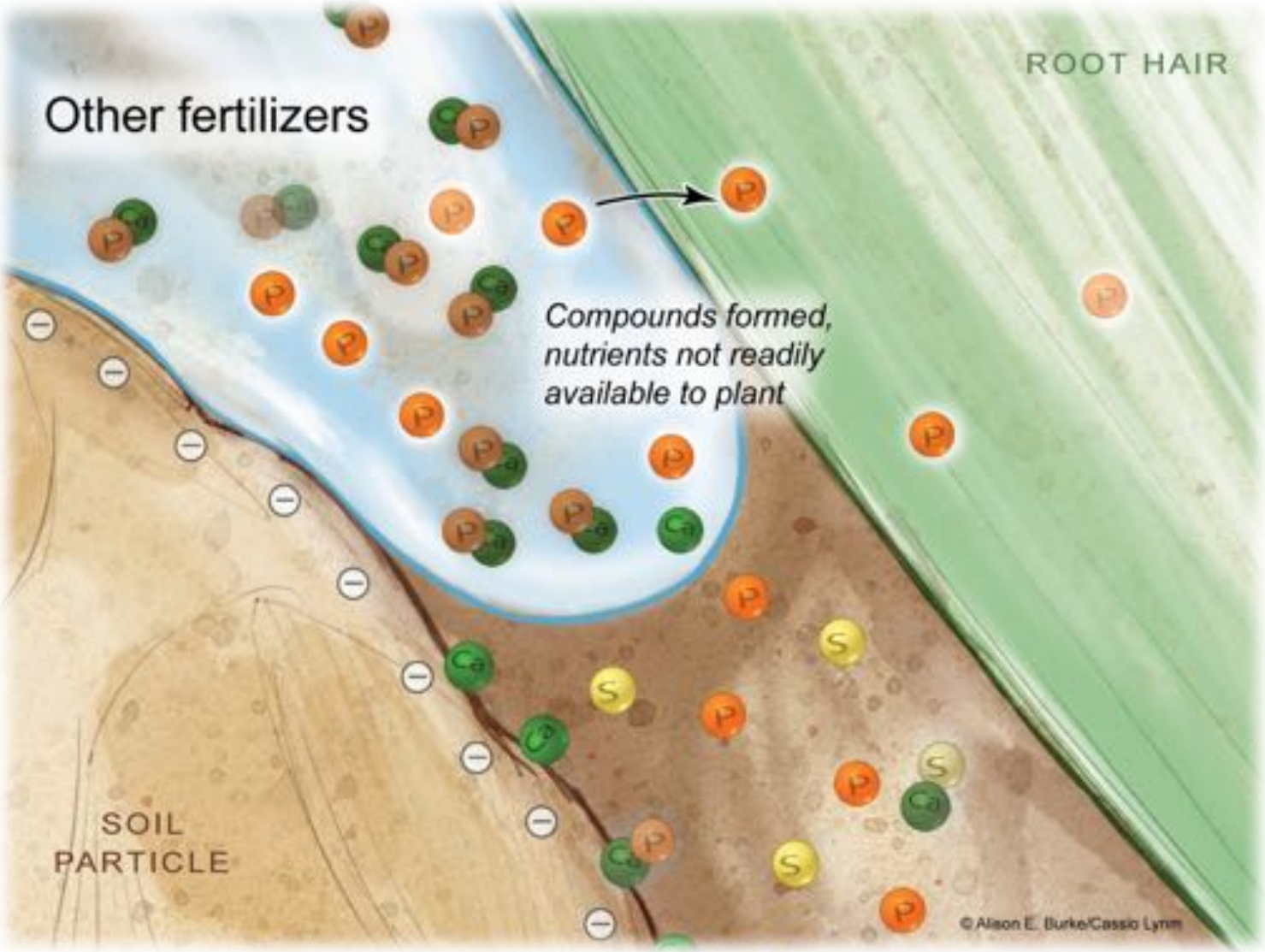
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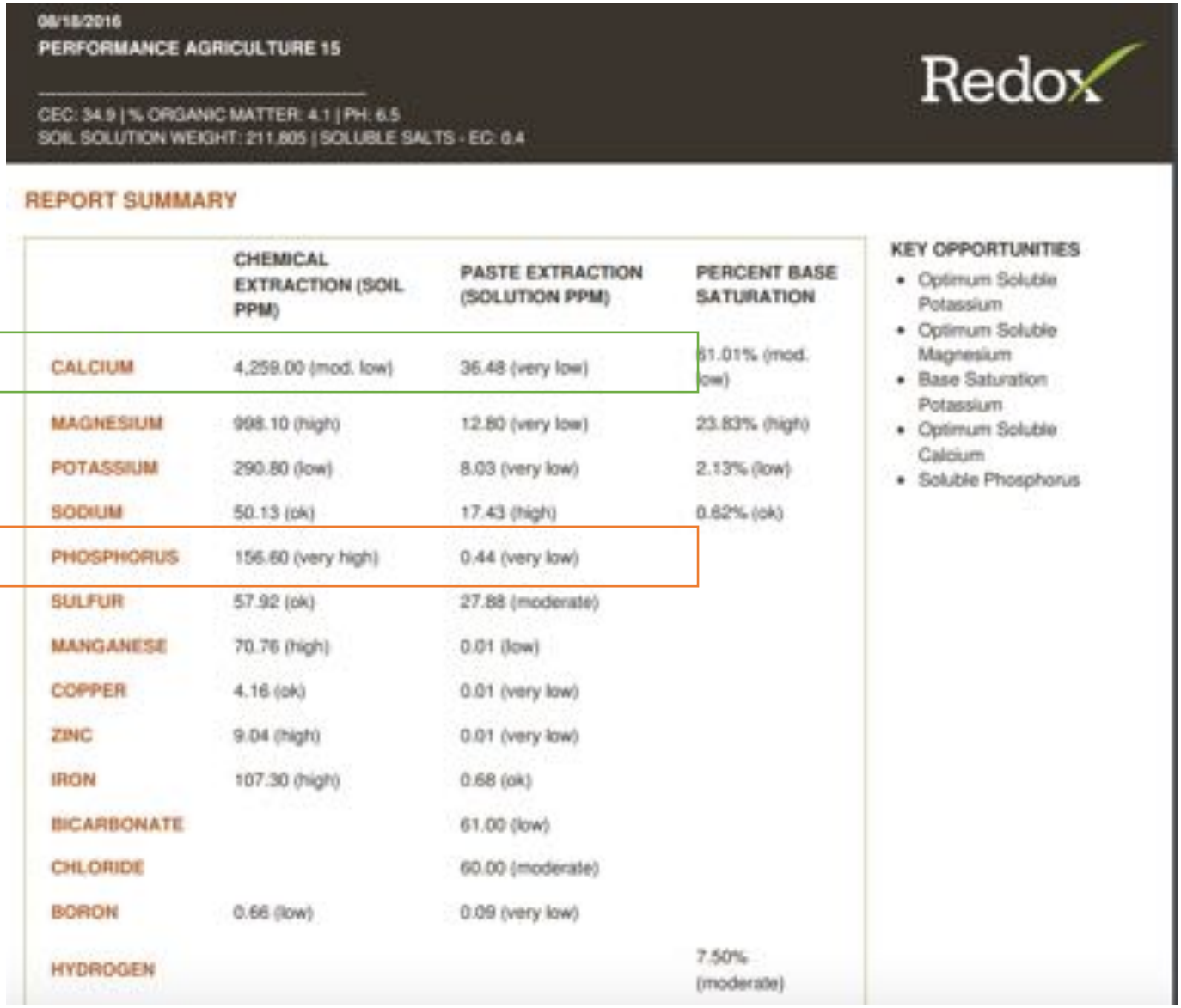

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- Base Saturation Potassium
- Optimum Soluble Calcium
- Soluble Phosphorus

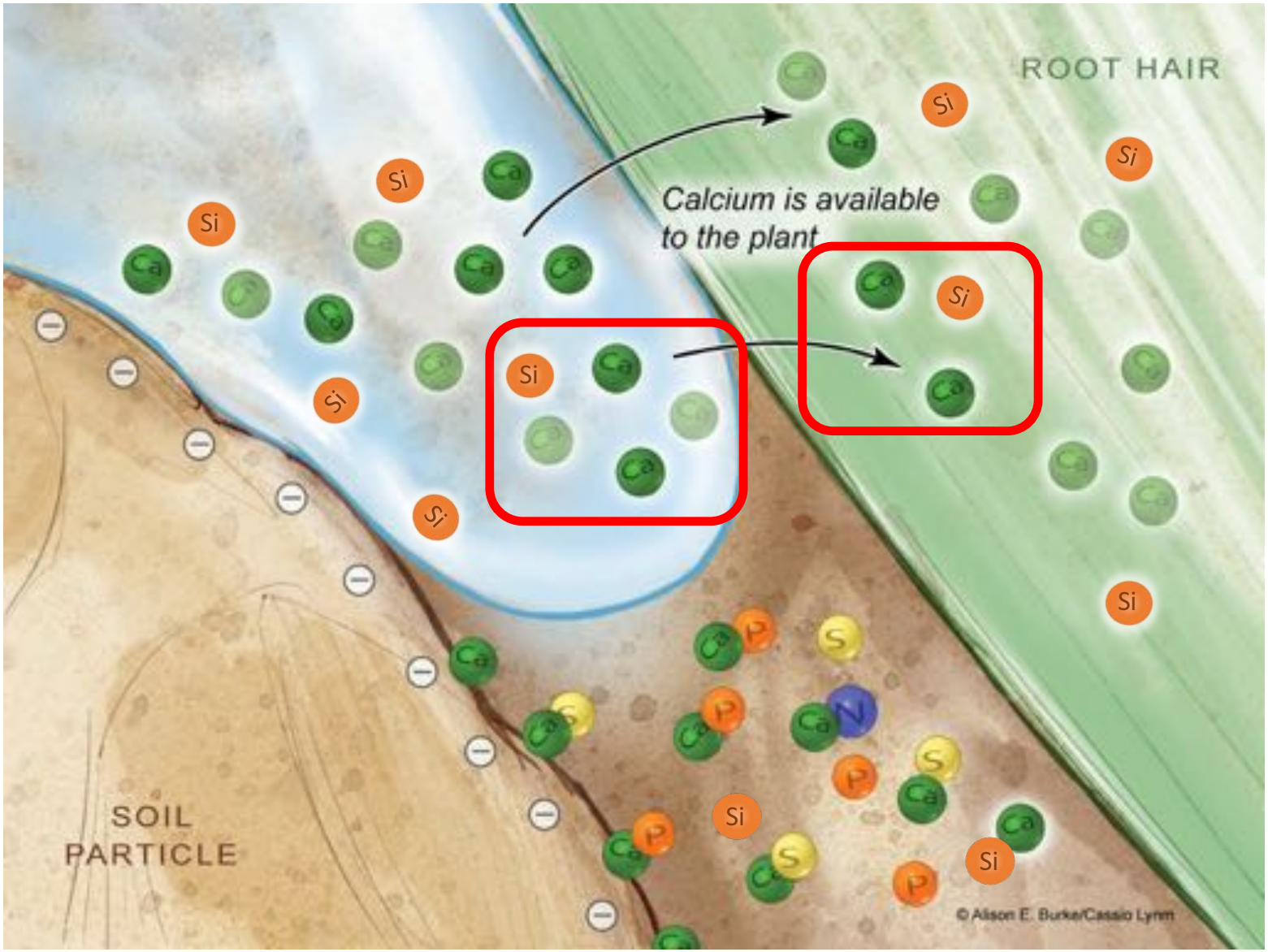
Redox

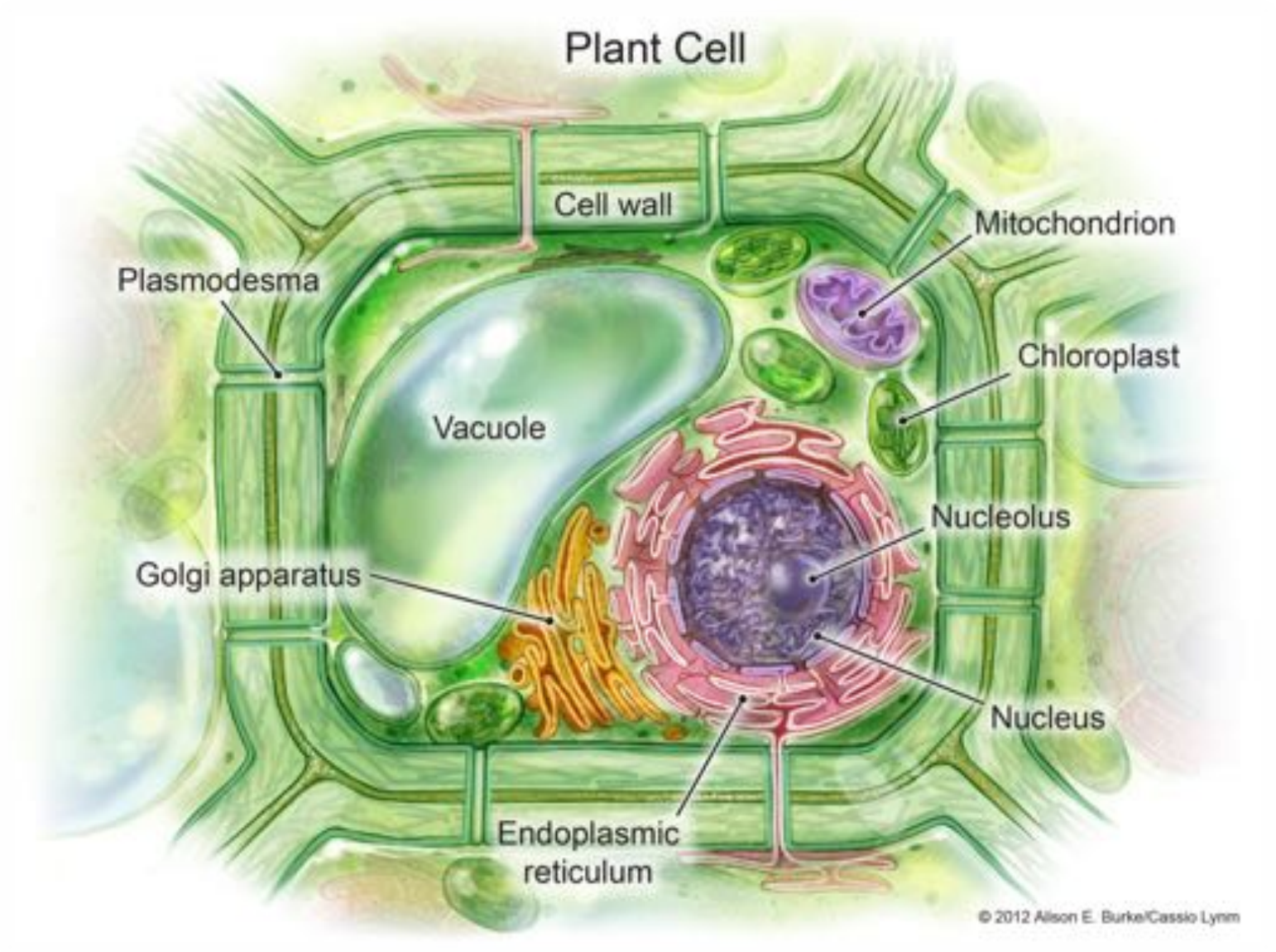

Silicon
Redox

This image cannot currently be displayed.

- ✓ Silicone
- ✓ Silica
- ✓ Silicon

Redox


ROOT HAIR
Calcium is available to the plant
SOIL PARTICLE
© Alison E. Burke/Cassio Lynn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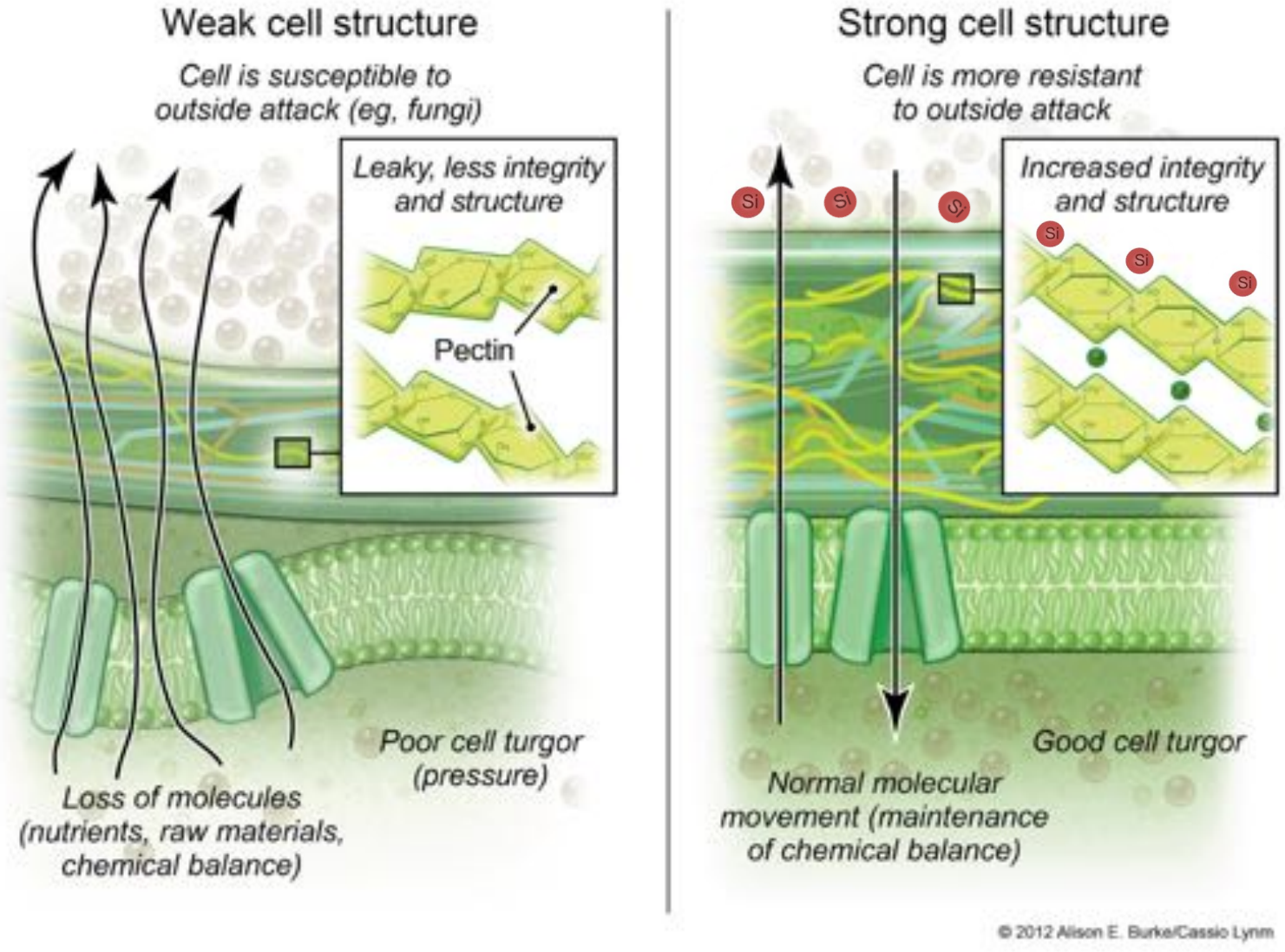
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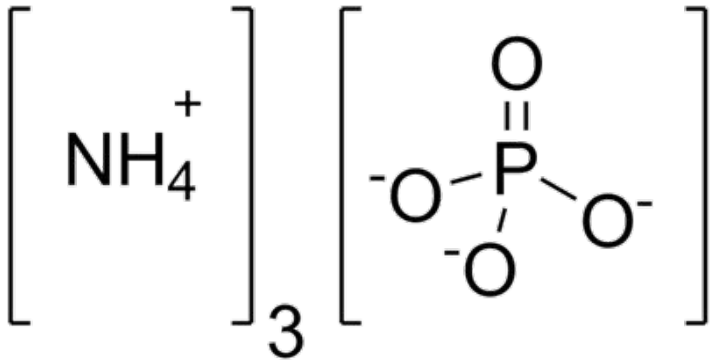
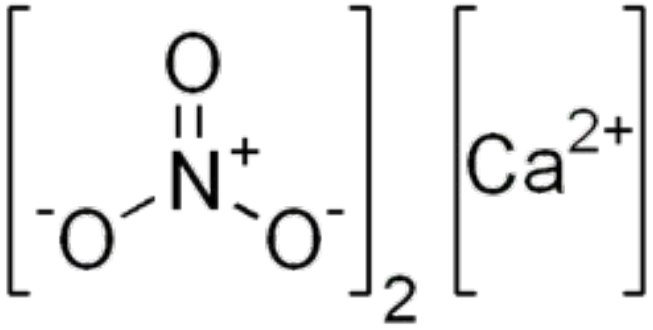
Mixing Demo

10-34-0



CAN-17



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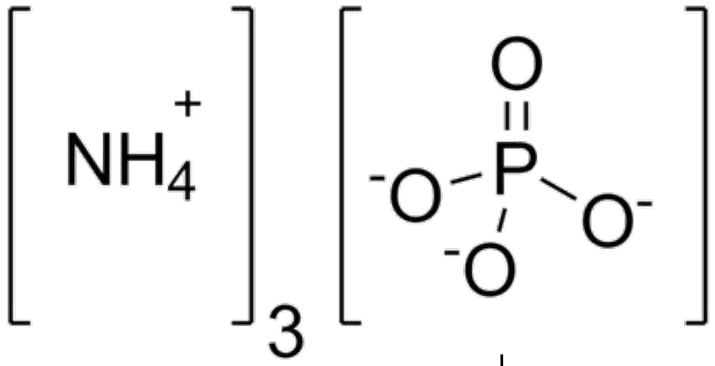

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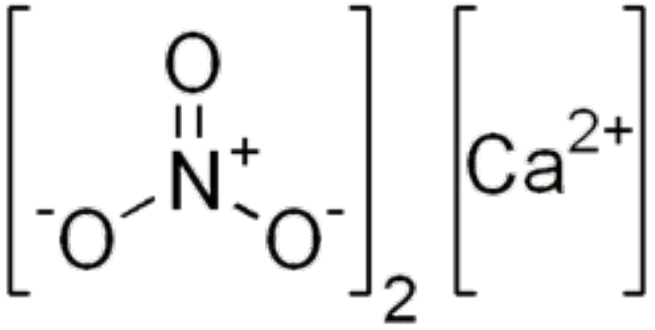
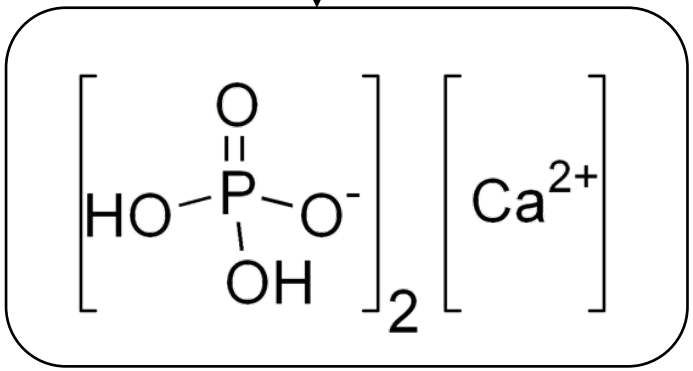
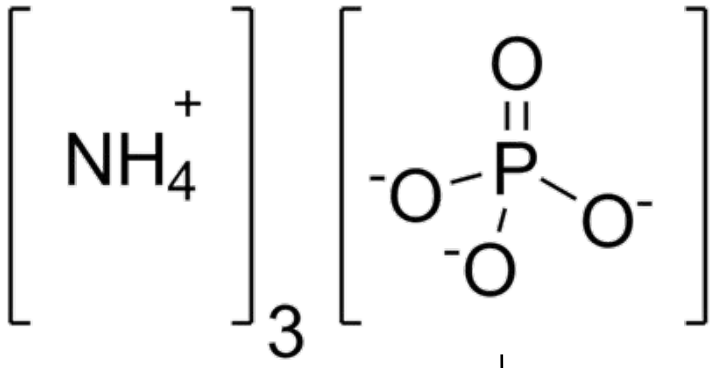




Calcium Phosphate (Insoluble)

Redox

10-34-0



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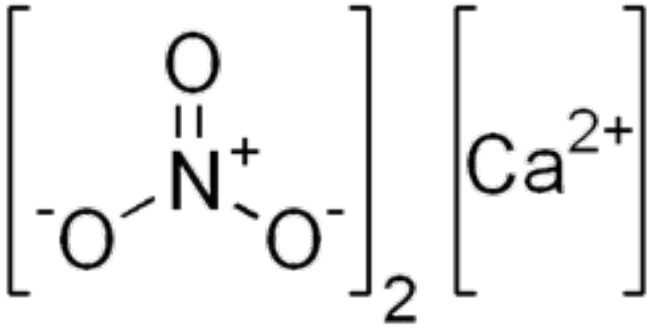

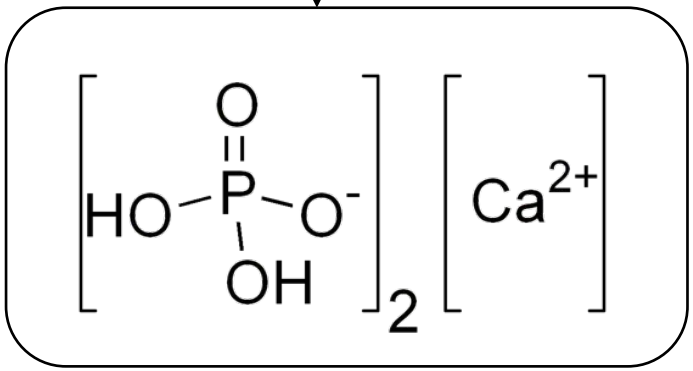

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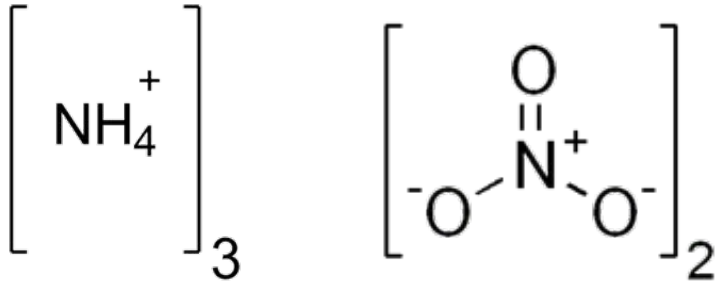

Ammonium and Nitrate

Redox

WHAT DOES REDOX DO?

Redox incorporates eleven distinct types of soluble carbon chemistries with plant nutrients to dramatically improve plant uptake, input efficiency and results.

1. Calcium-Oxygen Compounds
2. Fulvic Acid
3. Humic Acid
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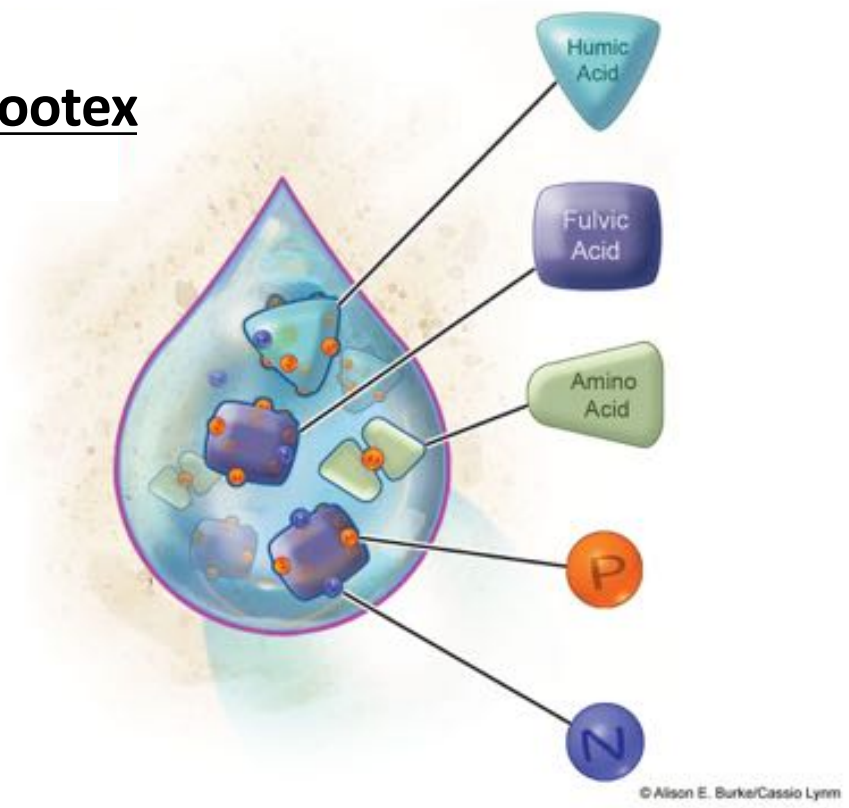
10. L-Amino Acids
11. Carboxylic Acid

Redox

Mixing Demo

Rootex



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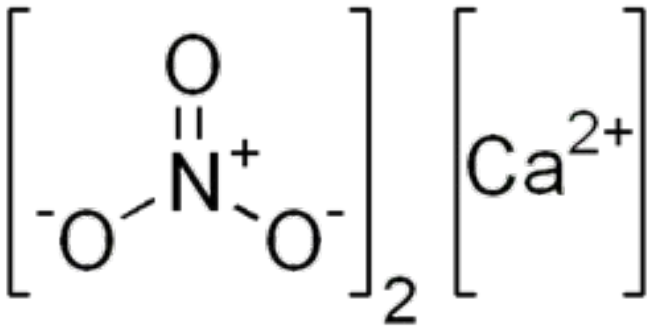

No Reaction

Mixing Demo

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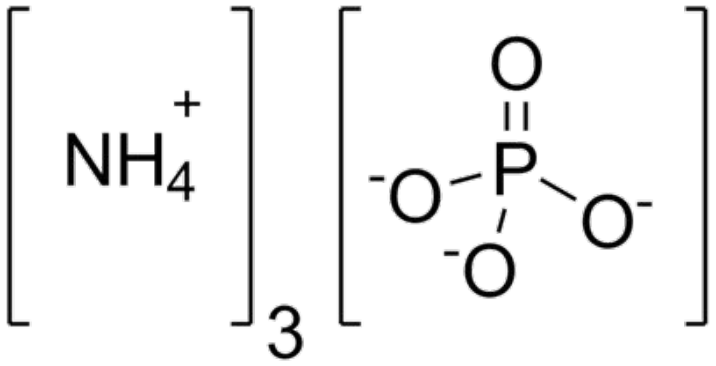
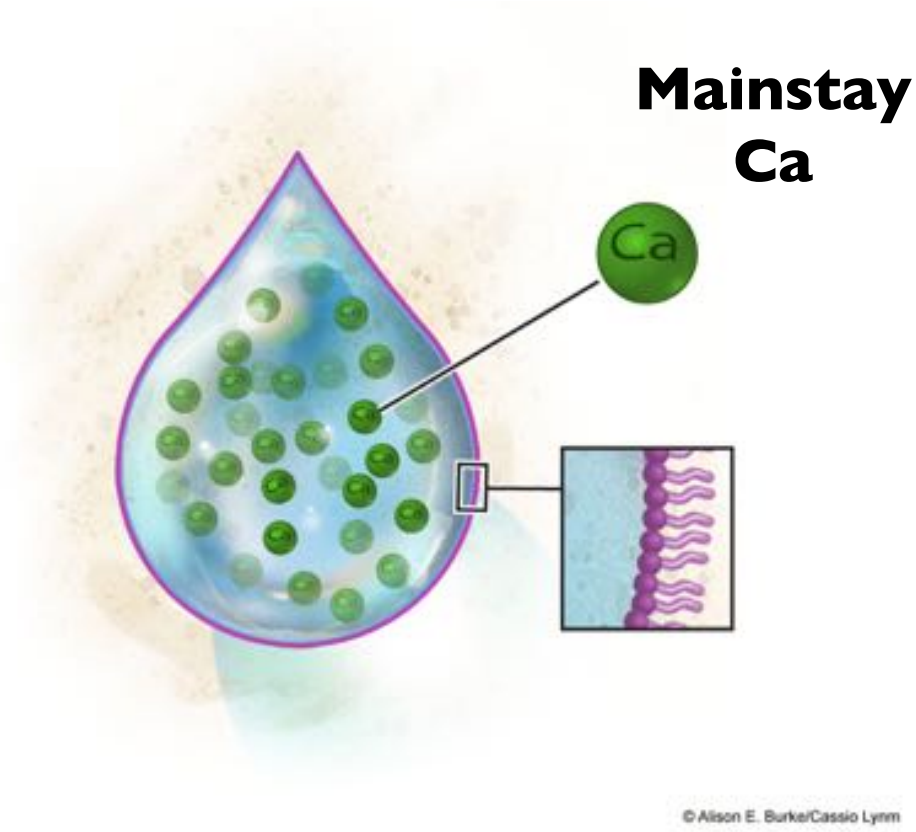


Mainstay Ca



No Reaction

PHOSPHOROUS – Related Products

Rootex
P-58
diKaP

ROOTEX

WHAT IS IT?

A reacted plant nutrient product high in phosphorus.

GUARANTEED ANALYSIS

Soluble nitrogen (N)	6%
Available phosphate (P_2O_5)	46%
Soluble potash (K_2O)	5%
Total available primary plant food	60%
Humic acid	3%
L-amino acids	8%

ROOTEX

HOW DOES IT WORK?

Rootex stimulates root growth due to the phosphorus and L-amino acid content.

Redox

ROOTEX

REDOX SOLUBLE CARBON CHEMISTRY

1. Calcium-Oxygen Compounds
2. Fulvic Acid
3. Humic Acid
4. Long Chain Carbon Complex
5. Micro-encapsulation Surfactant
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7. Juglone Extract (black walnut)
8. Salix Extract (willow)
9. Fermentation Extract Mannitol
10. L-Amino Acids
11. Carboxylic Acid

Redox

ROOTEX

- Stimulates root growth due to the phosphorus and L-amino acid content.
- Very efficient due to the complexing process.

APPLICATION: Apply 1-4 lbs./acre to the root zone at time of high phosphorus needs and rooting

Redox

P-58

WHAT IS IT?

A reacted plant nutrient product high in phosphorus.

GUARANTEED ANALYSIS	
Soluble nitrogen (N)	10%
Available phosphate (P_2O_5)	58%
Humic acid	3%
L-amino acids	2%

P-58

HOW DOES IT WORK?

P-58 provides high efficiency P nutrition due to unique Redox complexing process.

P-58

REDOX SOLUBLE CARBON CHEMISTRY

1. Calcium-Oxygen Compounds
2. Fulvic Acid
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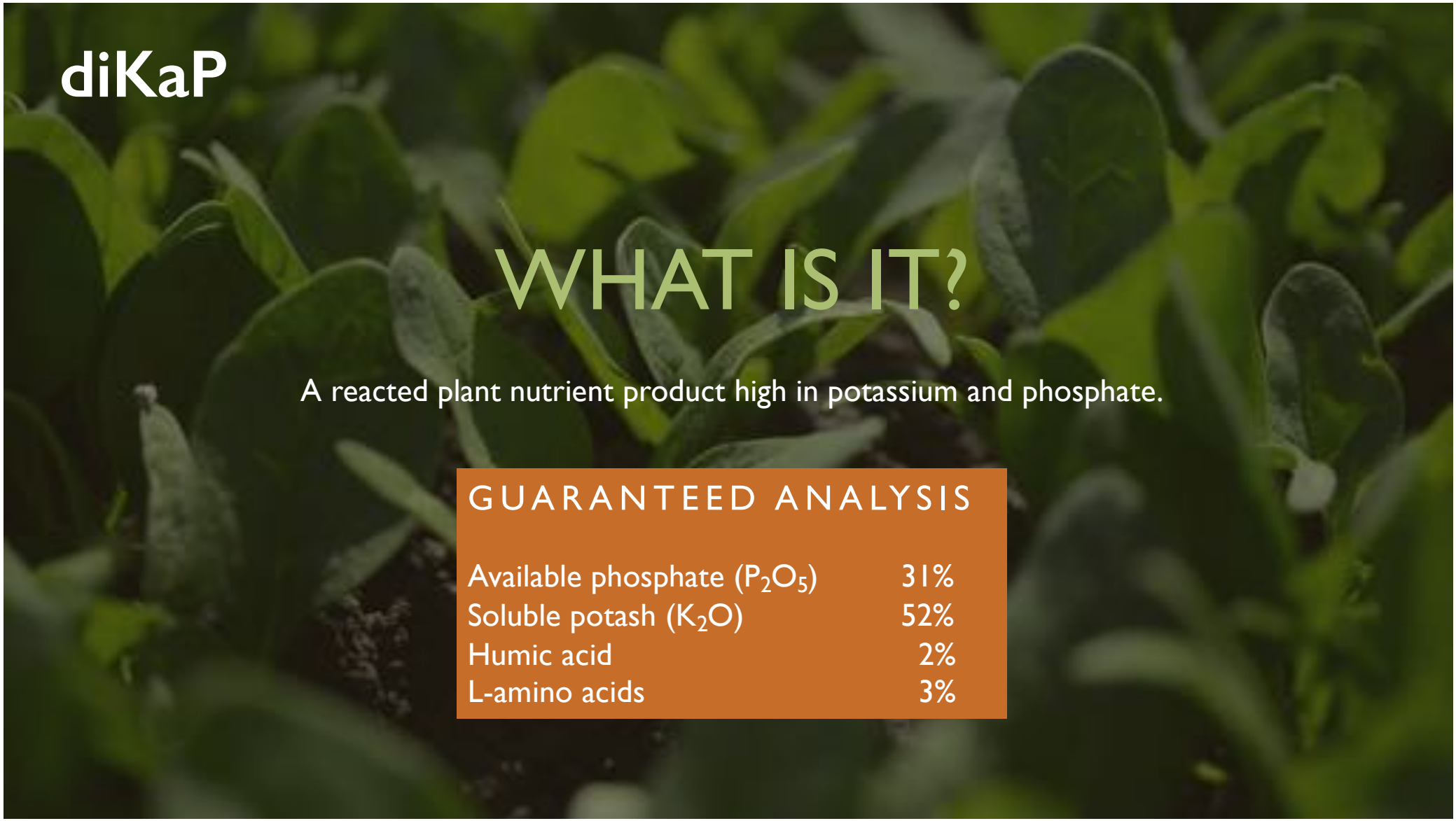
10. L-Amino Acids
11. Carboxylic Acid

Redox

P-58

- Very efficient source of phosphorus due to the complexing process

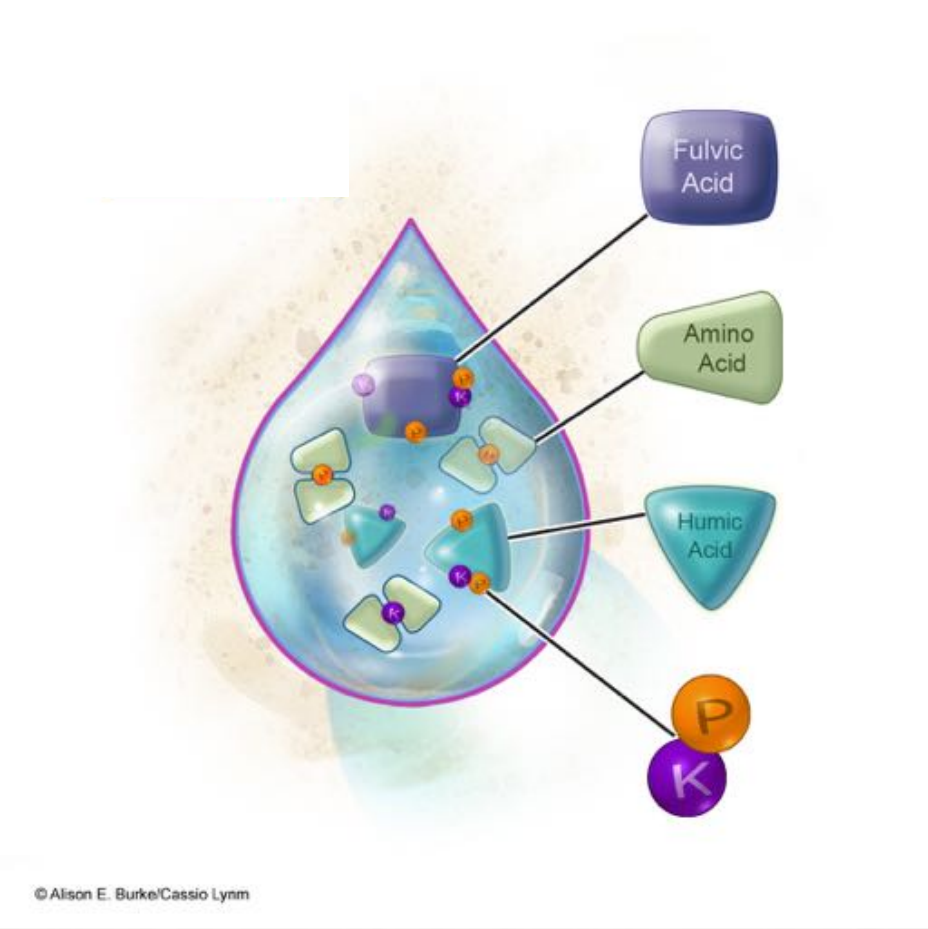
APPLICATION: 1-6 lbs./acre via foliar application or fertigation at time of high phosphorus needs


diKaP
WHAT IS IT?
A reacted plant nutrient product high in potassium and phosphate.
GUARANTEED ANALYSIS
Available phosphate (P_2O_5) 31%
Soluble potash (K_2O) 52%
Humic acid 2%
L-amino acids 3%

diKaP

HOW DOES IT WORK?

diKap is unique in its ability to promote phenolic compound production.



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diKaP

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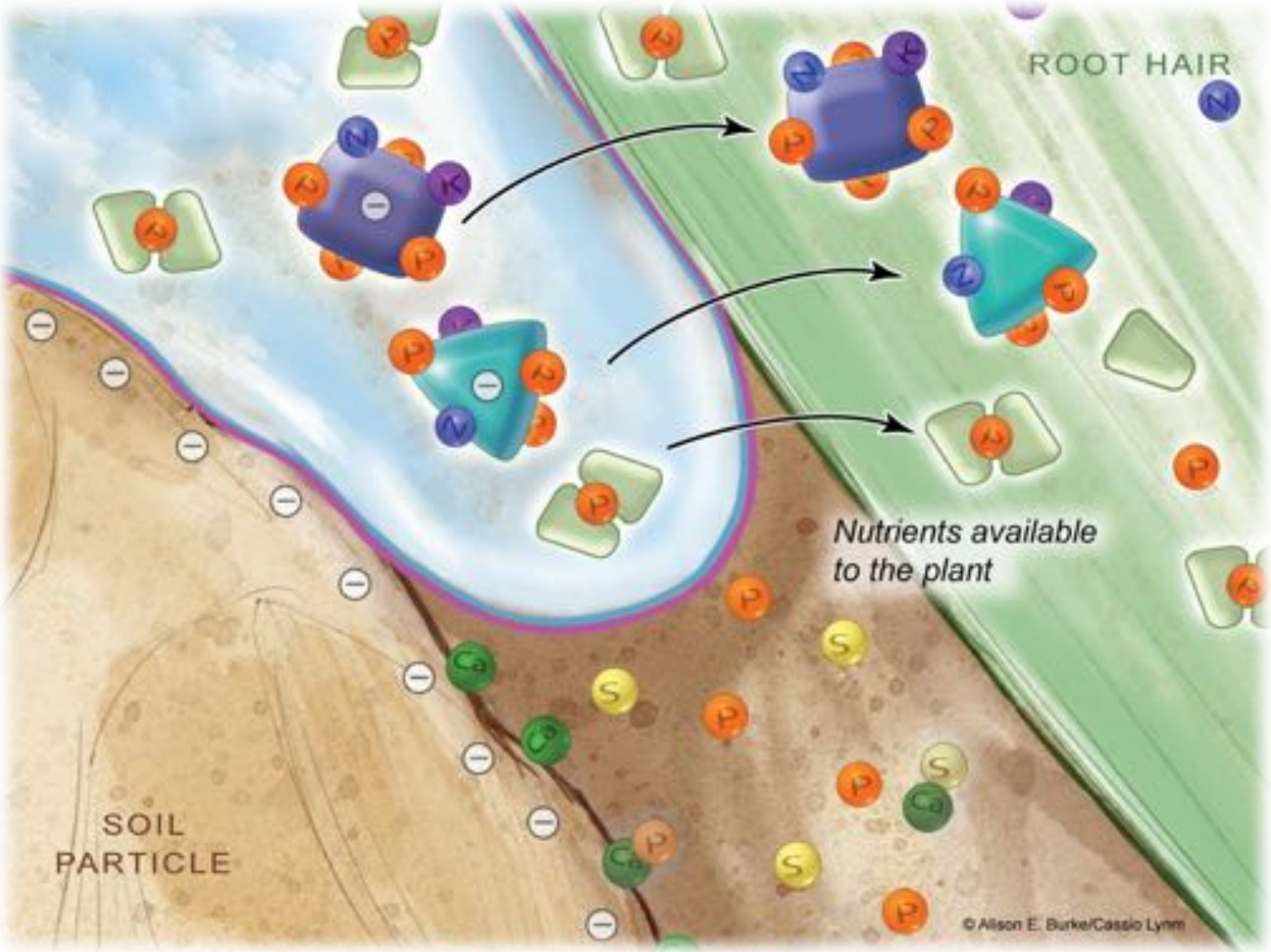
Redox

diKaP

- Unique in its ability to promote the production of phenolic compounds
- Provides available potassium and phosphorous nutrition
- Beneficial under conditions of heat and water stress, and may prove highly beneficial for optimum fruit size
- Tank mixes well with pesticides

APPLICATION: 1-5 lbs./acre via foliar or fertigation at times of stress

Redox


ROOT HAIR
Nutrients available
to the plant
SOIL
PARTICLE
© Alison E. Burke/Cassio Lynn

Redox

PHOSPHOROUS – Related Products

Rootex – High Efficiency P source, Stimulates rooting, Soil Applied

P-58 – High Efficiency P source, Foliar or Soil Applied

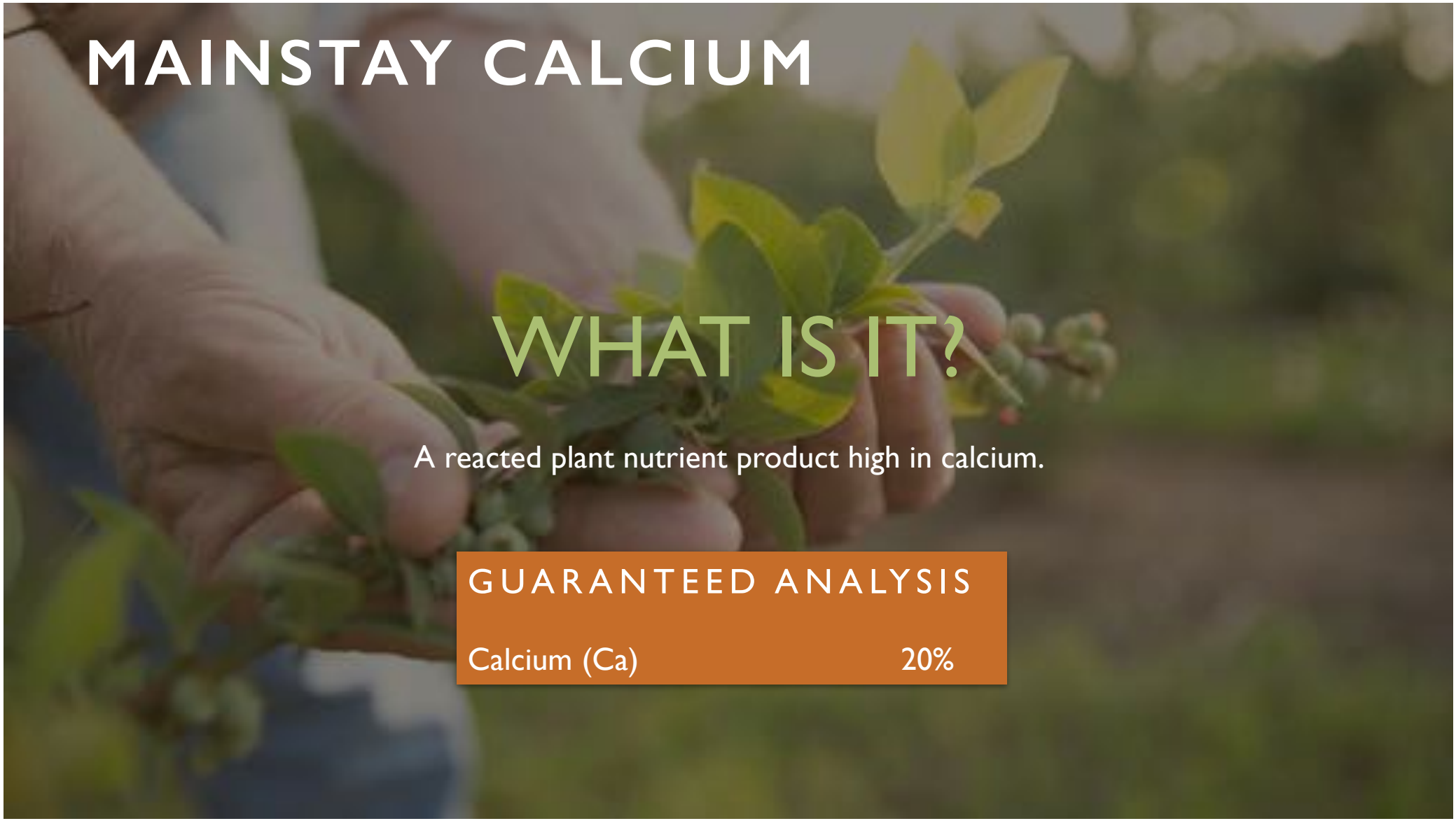
diKaP – High Efficiency P and K source, Foliar or Soil Applied
Helps Plant Fight Stress

Redox


Calcium
Redox

CALCIUM – Related Products

Mainstay Calcium
Mainstay Calcium Si


MAINSTAY CALCIUM
WHAT IS IT?
A reacted plant nutrient product high in calcium.
GUARANTEED ANALYSIS
Calcium (Ca) 20%

MAINSTAY CALCIUM

HOW DOES IT WORK?

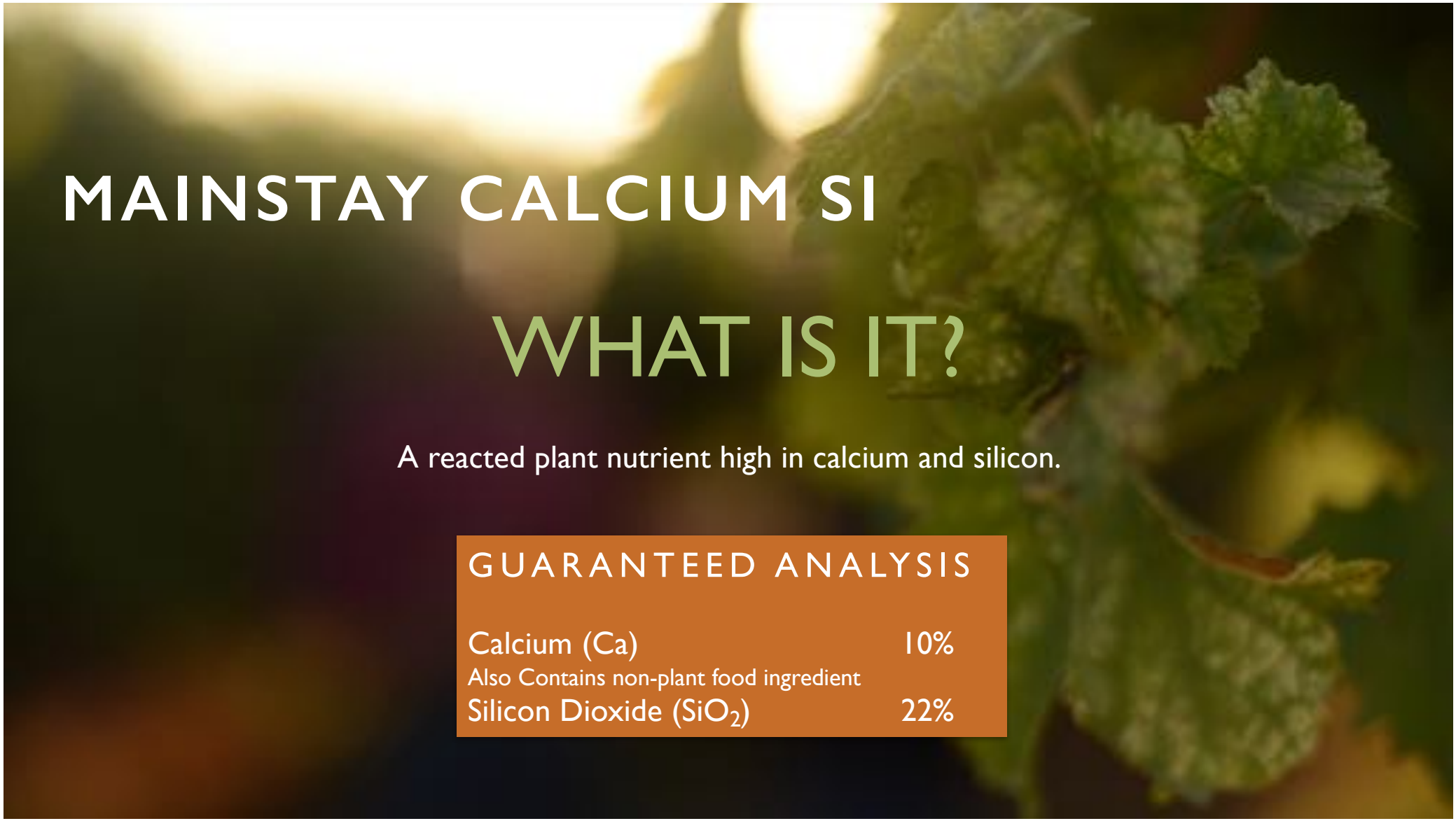
High plant absorption and utilization due to microencapsulation.

MAINSTAY CALCIUM

- Plants efficiently absorb Mainstay Calcium – proprietary micro encapsulation technology
- Use when increased plant available calcium is required

APPLICATION: Apply 0.5 - 2 gal./acre to the soil during periods of critical calcium requirements

Redox



MAINSTAY CALCIUM SI

WHAT IS IT?

A reacted plant nutrient high in calcium and silicon.

GUARANTEED ANALYSIS

Calcium (Ca)	10%
Also Contains non-plant food ingredient	
Silicon Dioxide (SiO_2)	22%

MAINSTAY CALCIUM SI

HOW DOES IT WORK?

Strengthen cell walls and reduces oxidative stress.

MAINSTAY CALCIUM SI

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MAINSTAY CALCIUM SI

- Plants efficiently absorb both calcium and silicon from this product
- Use where increased plant available calcium and silicon is required

APPLICATION: Apply at 0.25-1 gal. /acre as a foliar spray or through irrigation during periods of critical calcium requirements.

Redox

CALCIUM – Related Products

Mainstay Calcium
– High Efficiency Ca Source, Soil Applied, Rooting and Maintenance

Mainstay Calcium Si
– High Efficiency Ca Source, Foliar or Soil Applied, Fruit Quality

Redox

P & K EFFICIENCY

REDOX PROGRAM REDUCES P & K INPUTS

potato

THE TRIAL

I.

WHO

Dr. Mark Pavek – Washington State University

II.

WHAT

WSU is evaluating various Phosphorus products against their traditional grower standard program

III.

WHERE

WSU Othello Field Station

IV.

WHEN

Spring / Summer

RESEARCH OBJECTIVES

Compare conventional program to high sustainability Redox program

EVALUATION PARAMETERS

- Yield
- Marketable Yield
- Tuber Weight
- Tubers per plant
- Specific gravity

INPUTS

Conventional program compared to high sustainability Redox program

- **We used the same fertilizer budget dollar**
- **Both programs received seed treatment, insecticide and fungicide applications as appropriate and 150 units N pre-plant plus 200 units N in-season**

Grower Standard

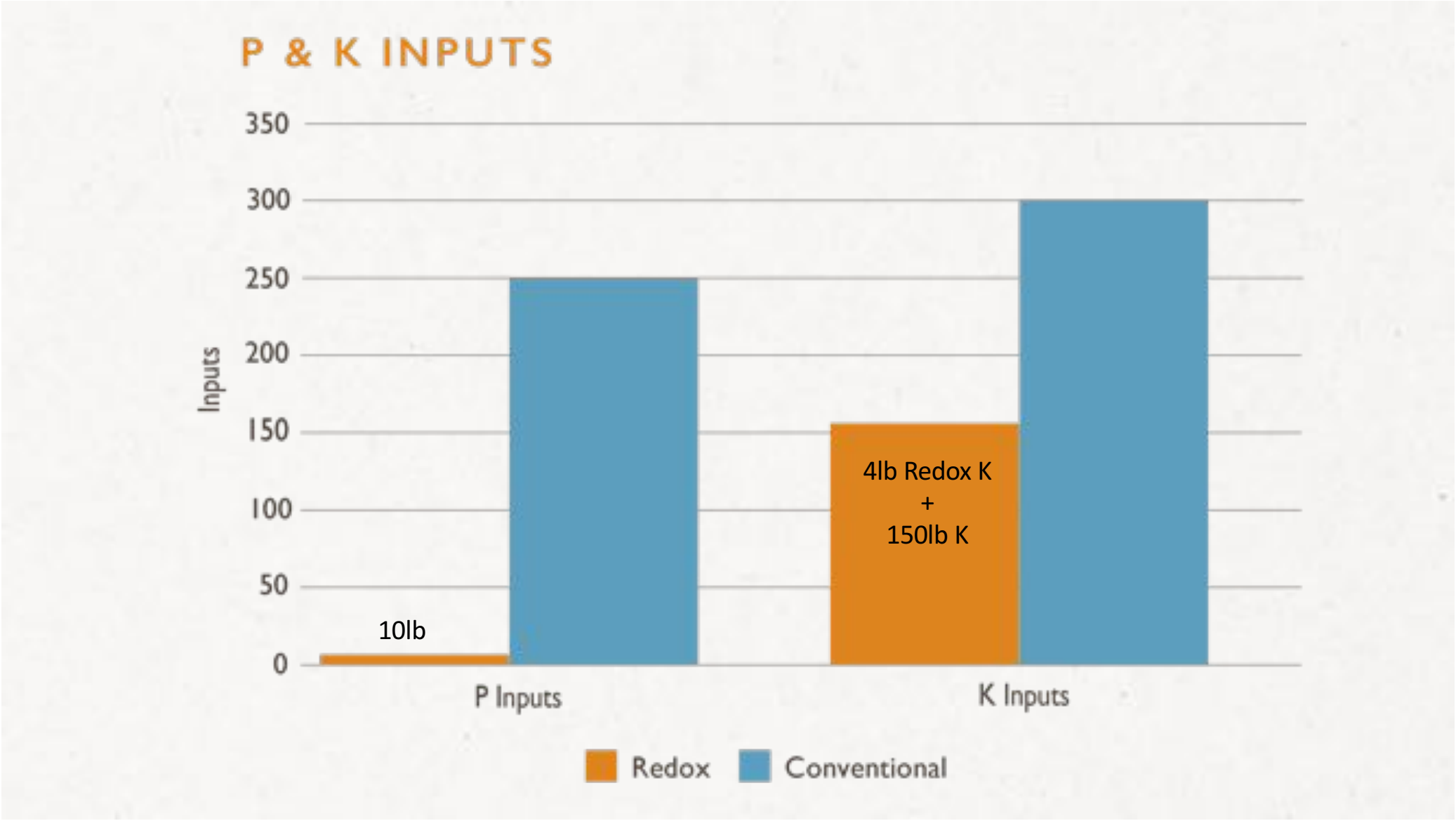
Pre-plant: 250 lbs. P, 300 lbs. K

Redox

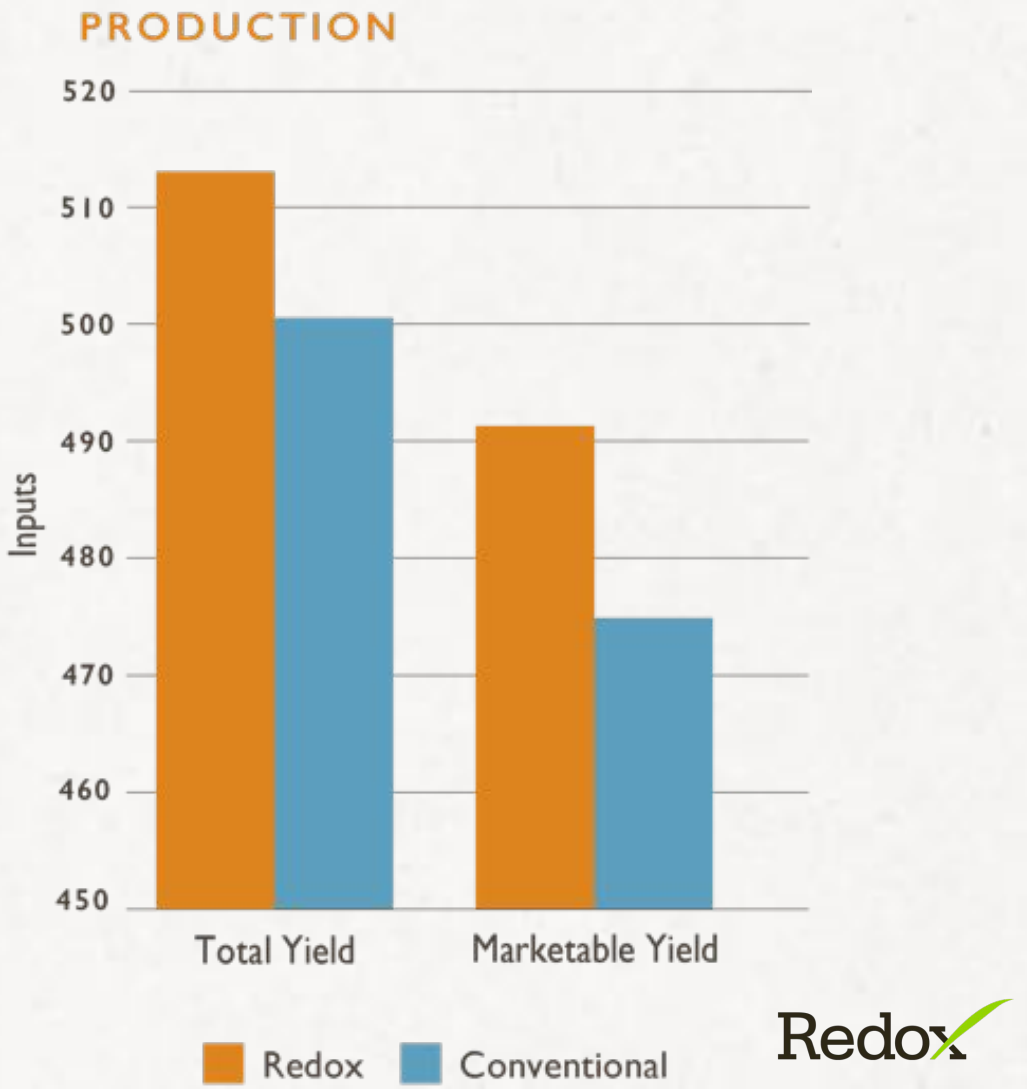
Pre-plant: 150 lbs. K

Planting and rosette stage: 2 lbs. Rootex and 1 lbs. H-85.

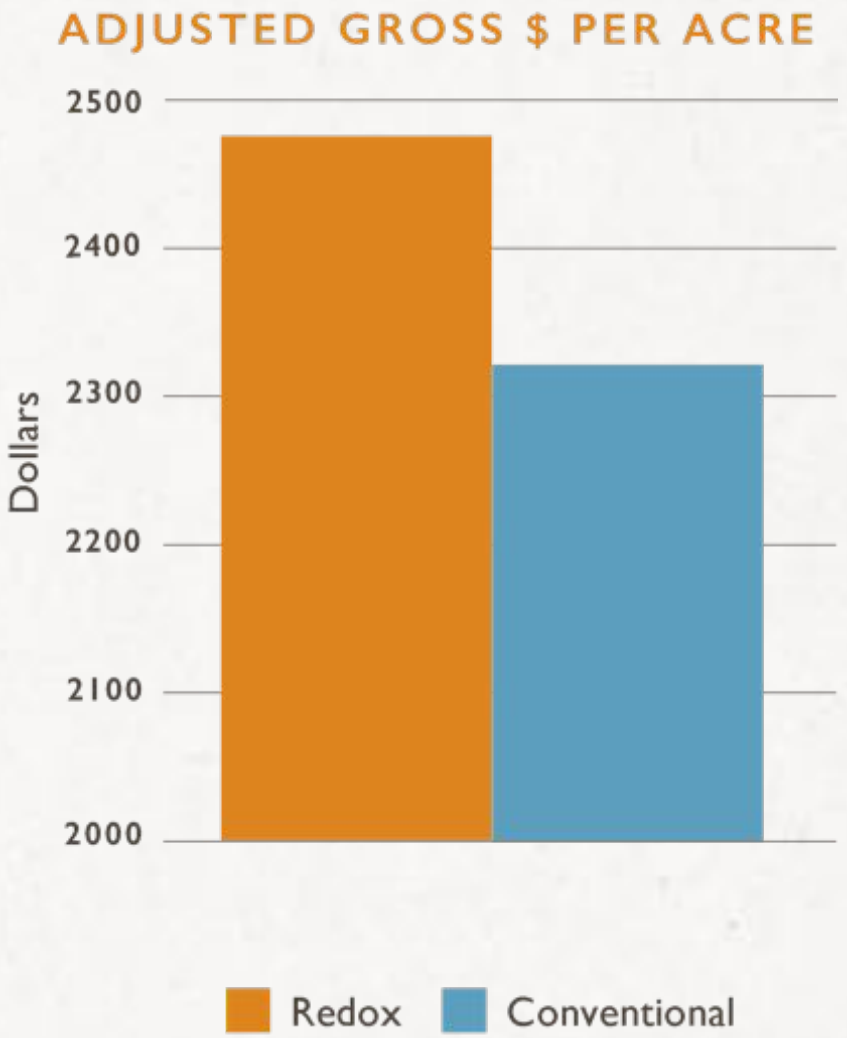
5 times in-season (2 wk interval): 2 lbs. P-58 and 1.5 lbs. diKaP


P & K INPUTS
350
300
250
200
150
100
50
0
Inputs
10lb
4lb Redox K
+
150lb K
P Inputs
K Inputs
Redox
Conventional

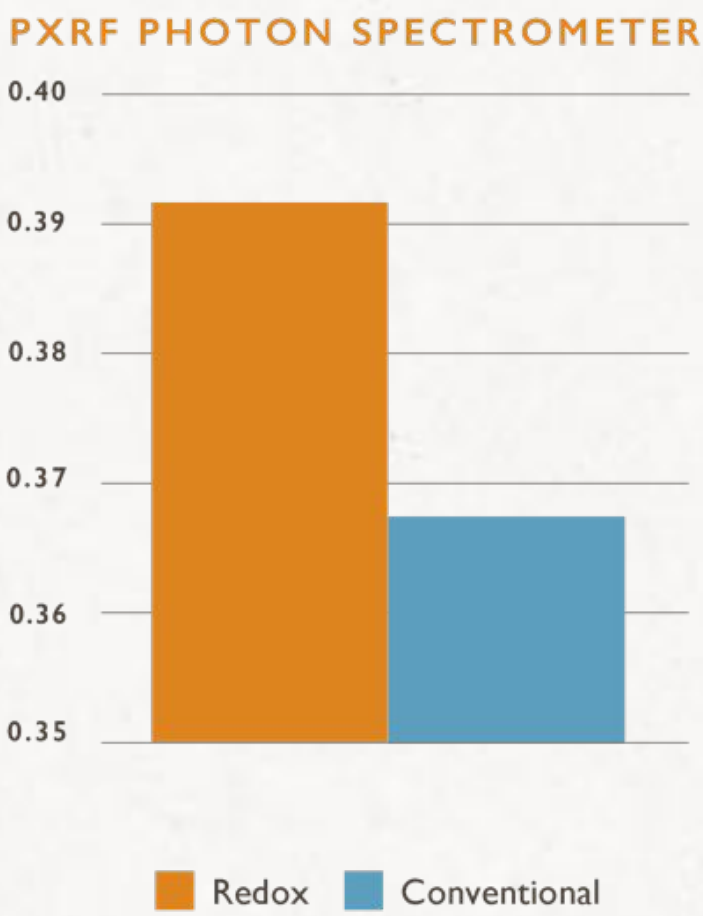
KEY OUTCOMES



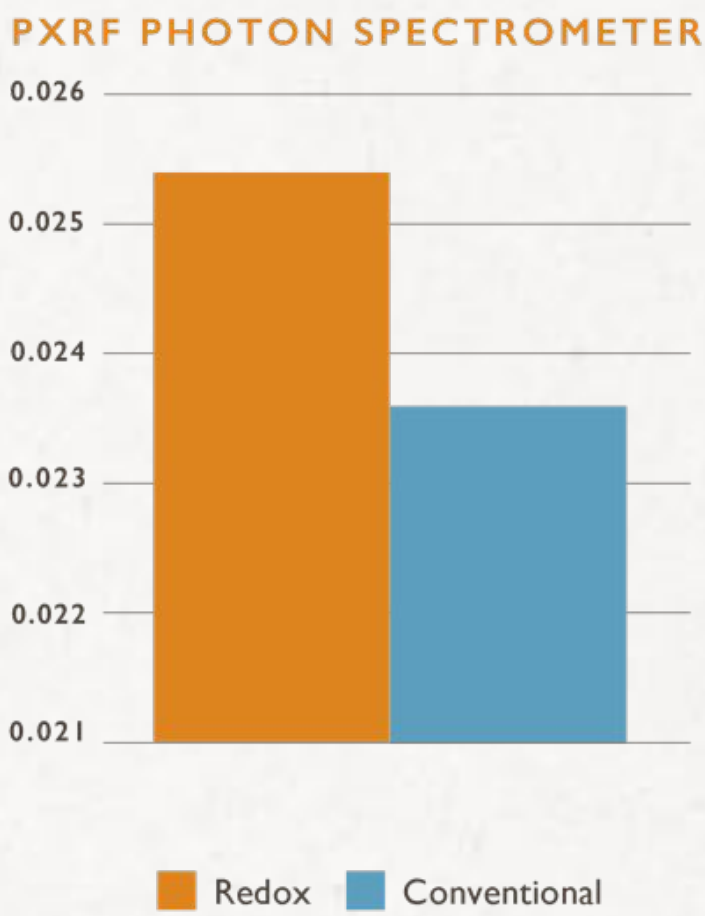
KEY OUTCOMES



Redox

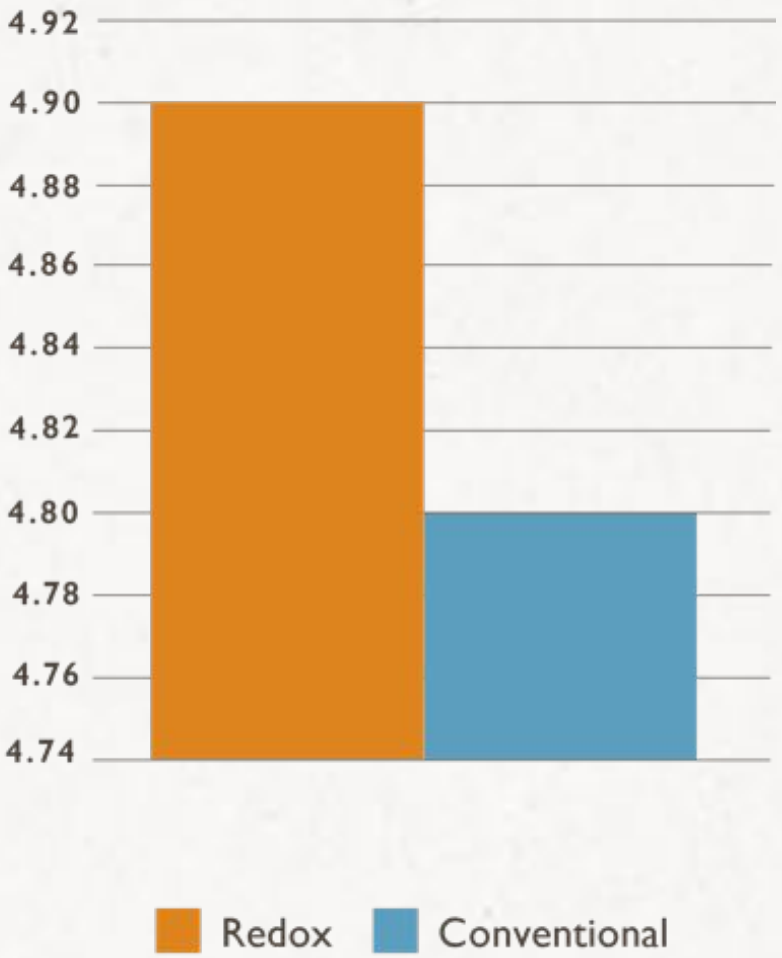


7.7% Increase

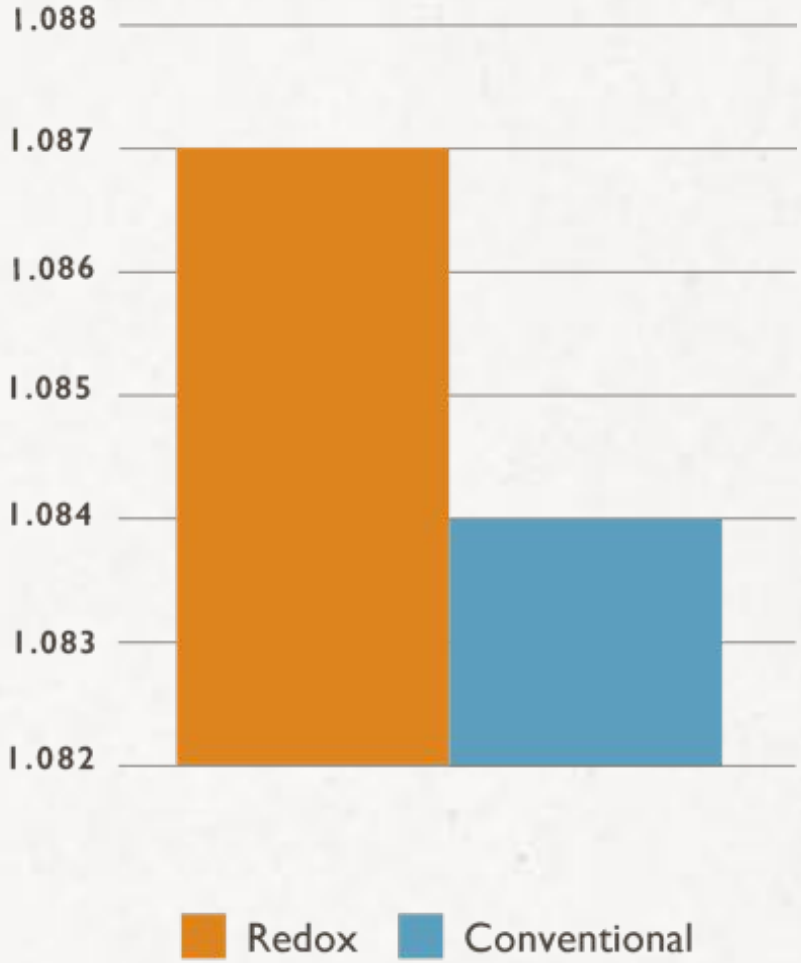


7.6% Increase

TUBER WEIGHT



TUBER SPECIFIC GRAVITY



CROP QUALITY

MAINSTAY CALCIUM SI REDUCES PEAR CORKING

PEAR

THE TRIAL

I.

WHO

Dr. Lee Kalcits - Washington State University

II.

WHAT

WSU is evaluating calcium products against traditional grower standard program

III.

WHERE

Cashmere and Wenatchee, Washington

IV.

WHEN

Spring / Summer

RESEARCH OBJECTIVES

To evaluate the benefit of Mainstay Calcium Si on pear corking, and fruit calcium and silicon levels.

EVALUATION PARAMETERS

- Marketable Yield
- Ca and Si levels in fruit
- Corking Incidence

INPUTS

Conventional program compared to replacing two of four applications of Metalosate Ca with Mainstay Ca Si.

CONVENTIONAL PROGRAM

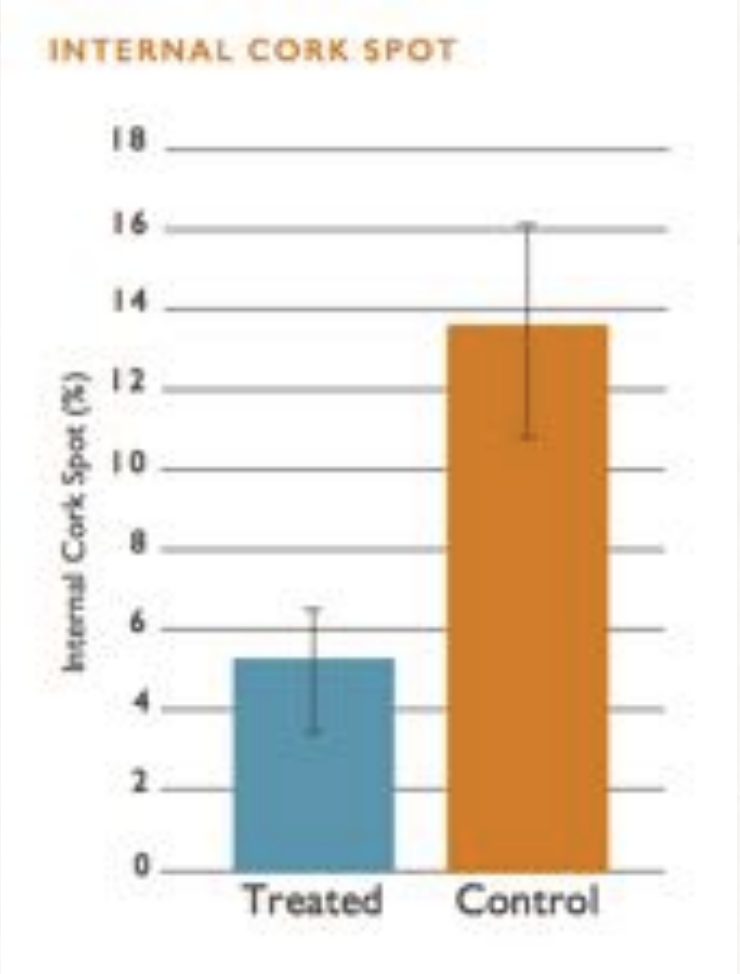
TIMING	PRODUCTS
PETAL FALL (APRIL 12) REPEAT 2 WEEKS LATER (APRIL 26)	0.125 gal./acre B-52 / 0.75 gal./acre Albion Metalosate Calcium
MAY 9 REPEAT 2 WEEKS LATER (APRIL MAY 25)	0.125 gal./acre B-52 / 0.5 gal./acre Albion Metalosate Calcium
JUNE 22 REPEAT EVERY 2 WEEKS (JUNE 29, JULY 19, & JULY 24)	0.125 gal./acre B-52 / 0.375 gal./acre Quik-Cal
AUGUST 3	3.125 gal./acre Nutr Phos CalZinc
SEPTEMBER 12	0.1875 gal./acre ProBor 17

REDOX PROGRAM

TIMING	PRODUCTS
PETAL FALL (APRIL 12) REPEAT 2 WEEKS LATER (APRIL 26)	0.125 gal./acre B-52 / 0.5 gal./ acre Mainstay Calcium Si
MAY 9 REPEAT 2 WEEKS LATER (APRIL MAY 25)	0.125 gal./acre B-52 / 0.5 gal./acre Albion Metalosate Calcium
JUNE 22 REPEAT EVERY 2 WEEKS (JUNE 29, JULY 19, & JULY 24)	0.125 gal./acre B-52 / 0.375 gal./acre Quik-Cal
AUGUST 3	3.125 gal./acre Nutr Phos CalZinc
SEPTEMBER 12	0.1875 gal./acre ProBor 17

KEY OUTCOMES

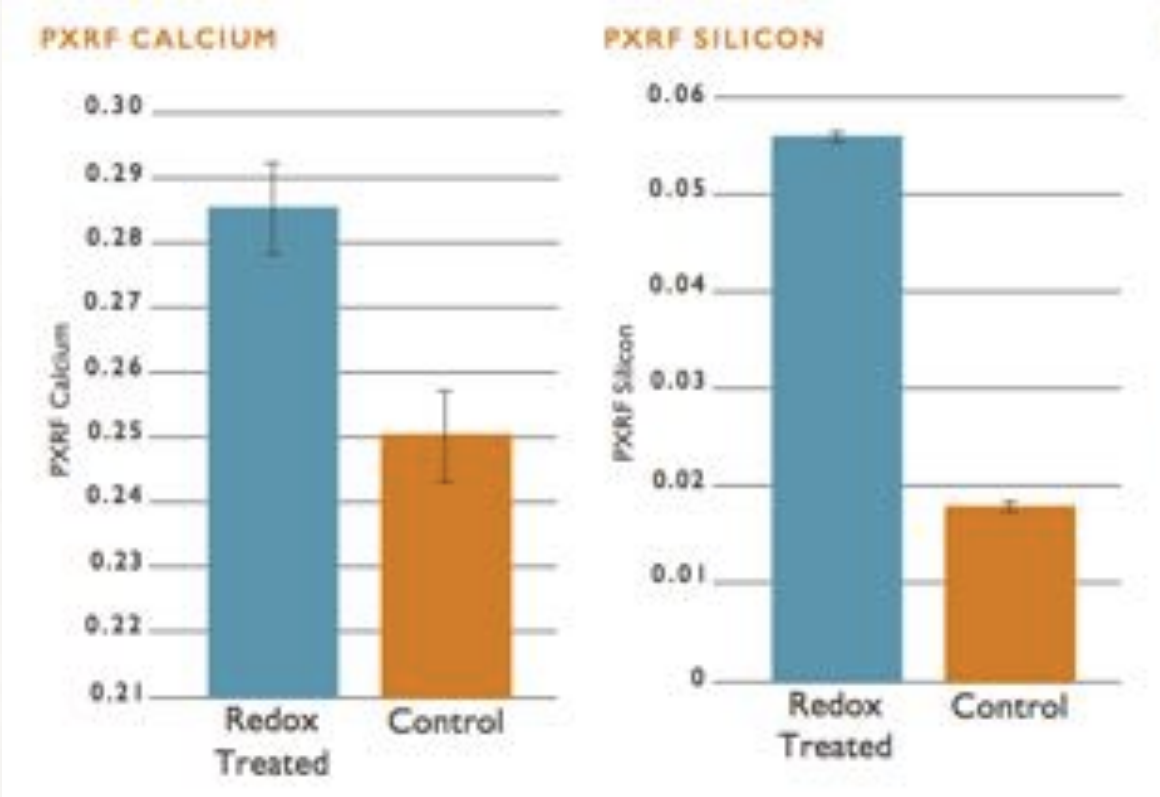
Mainstay Ca Si reduces corking by over half with the simple substitution of 2 applications of other Ca product



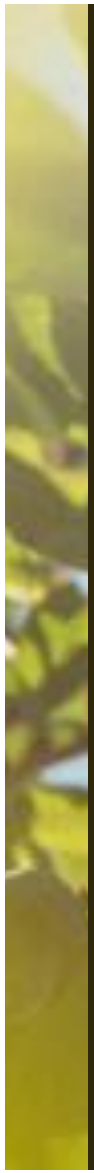
Redox

KEY OUTCOMES

Mainstay Ca Si increased uptake efficiency of Ca and Si



Redox



Redox

Danny Klittich, Ph.D.

Danny.klittich@redoxchem.com

C 805.625.4994
O 208.678.2610

130 SOUTH 100 WEST
BURLEY, ID 83318

redoxchem.com