



Fortress Plus



FolChel



PentaMag



RootStim



## UltraWet

FolChel is a EDTA chelated nutrient formulation along with amino acids and foliar surfactant that is compatible with Bordeaux mixture. Using FolChel along with your Bordeaux spray enhances the efficacy by ensuring better foliar coverage. The non-ionic surfactant Surfactant-V available along with FolChel helps in nutrient uptake. FolChel is recommended @ 150 gm per 200 L of water.

PentaMag is specially formulated for helping plants withstand high heat conditions by maintaining critical nutrients required during higher temperatures and drought like conditions.

PentaMag is a combination of Potassium, Magnesium, Calcium, Zinc, Boron along with amino acids and foliar surfactant.

PentaMag is recommended @ 1 L per 200 L. Use along with CalJet@ 500 gm per 200 L for best results under very high temperature condition.

# Management Strategies

- Quality requirements, yield requirements
- pH, nutrition level, CEC etc - Soil
- Crop requirements, environmental
- Balanced nutrition - Victus Inter

of pruning coffee tree and  
the art of producing new branch  
Dourado - Neto, Brazil Agronomi

RootStim is concentrated formulation of humic acids and amino acids useful in assisting the recovery of stressed root system. It is recommended to be used along with your curative measures like fungicides for root zone pathogens and termite control chemicals. RootStim has a positive effect in the root system and can be visualised by healthier roots with higher root mass when used in nursery. RootStim is recommended @ 500 gm per 200 L as root zone drench. For nursery applications use as per recommendations in the pack.

UltraWet is a superior non-ionic agricultural surfactant exhibiting exceptional spreading and penetration. It is very useful in enhancing the efficacy when used along your fungicide and insecticide application. UltraWet's superior activity can easily be visualized. UltraWet is recommended @ 50 ml per 200 L.

COFFEE & PEPPER

# ENHANCING COFFEE & PEPPER YIELDS THROUGH EFFICIENT NUTRITIONAL SOLUTIONS

1. Understanding your requirements
2. Understanding your soil status
3. Understanding your crop
4. How to address your crop requirements

- Quality requirements, yield requirements, expected price.
- pH, nutrition level, CEC etc - Soil Analysis.
- Crop requirements, environmental condition & crop status.
- Balanced nutrition -Victus Integrated Nutrient Management

art of pruning coffee tree and implement it  
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We nourish . . . . .

**Victus Laboratories India Private Limited**  
75, Gowtham Appartments, Sundaresa Layout,  
Trichy Road, Coimbatore - 641 018.  
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Balanced nutrition -Victus Integrated Nutrient Management

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Understand the art of pruning coffee tree and implement it

“The art of producing coffee is the art of producing new branches on the coffee tree”  
- Durval Dourado - Neto, Brazil Agronomist.



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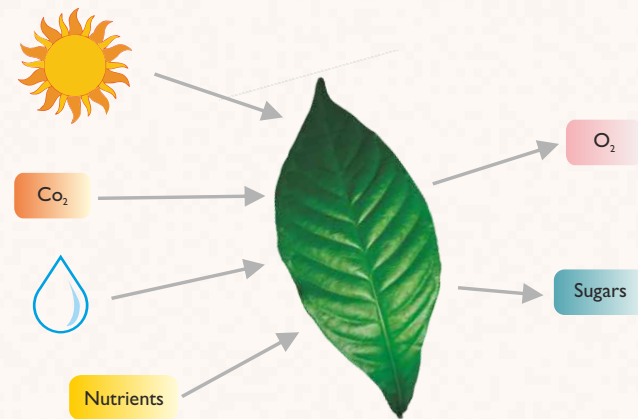
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## Requirement for Crop Growth



Sun light, water and CO<sub>2</sub> provides Carbon **C** ,  
 Hydrogen **H** and Oxygen **O** to the plant.  
 In addition to this plants also require Nitrogen **N** ,  
 Phosphorus **P** , Potassium **K** , Calcium **Ca** ,  
 Magnesium **Mg** , Sulfur **S** , Boron **B** , Zinc **Zn** ,  
 Iron **Fe** , Copper **Cu** , Manganese **Mn** and  
 Molybdenum **Mo** .

## Effect of nutrition on yield and quality in coffee<sup>1</sup>

|                         | N | P | K | Ca | Mg | S | B | Cu | Fe | Mn | Mo | Zn |
|-------------------------|---|---|---|----|----|---|---|----|----|----|----|----|
| FLOWERING AND BERRY SET | ▲ | ▲ |   |    |    |   | ▲ |    |    |    |    | ▲  |
| BEAN SIZE               | ▲ | ▲ |   |    |    |   | ▲ |    |    |    |    | ▲  |
| YIELD                   | ▲ | ▲ | ▲ | ▲  | ▲  | ▲ | ▲ | ▲  | ▲  | ▲  |    | ▲  |
| DISEASES                | ▲ |   | ▼ | ▼  |    | ▼ | ▼ | ▼  |    | ▼  |    | ▼  |
| CUP QUALITY             | ▼ |   | ▲ | ▲  |    |   |   |    | ▲  |    |    |    |
| CAFFEINE CONTENT        |   |   |   |    | ▲  | ▲ |   |    |    |    |    |    |

INCREASE ▲ REDUCTION ▼

## Nutrients in Pest and Disease Management

Balanced nutrition can reduce the incidence of pest and diseases

K

Ca

S

B

Cu

Mn

Most important nutrients for disease resistance

Zn

Indirectly involved in disease resistance

Some Facts

K

Involved in mobilization of plant defense system & increases cuticle thickness

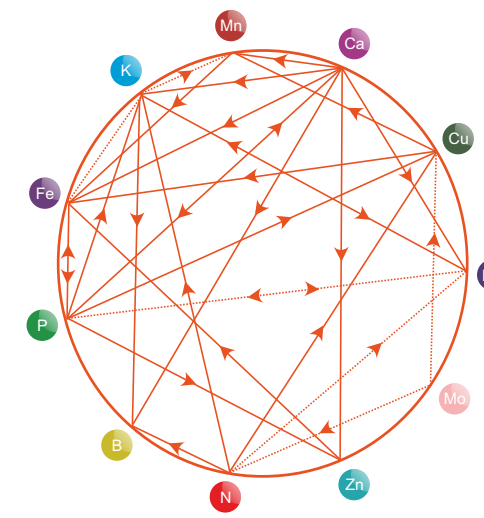
Ca

Fortifies middle lamella  
Slows the degradation by pathogens

B

Involved in metabolism of phenolics

## Plant Nutrient Interactions<sup>2</sup>



Plant nutrients interact with each other in a positive or negative manner.

- Antagonism →

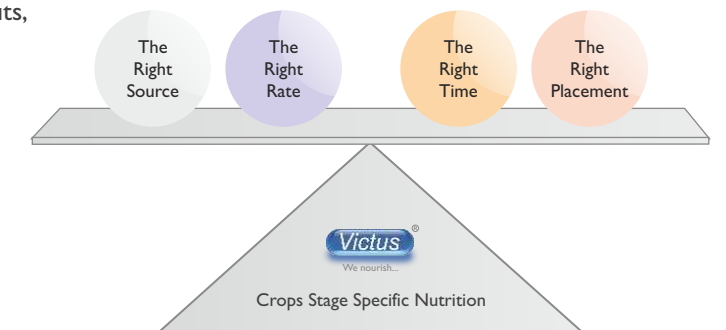
A decrease in availability of a nutrient due to the action of another nutrient (see direction of arrow).

+ Stimulation →

An increase in the requirement for a nutrient because of increase in level of another nutrient.

## Nutrient stewardship using 4R principles<sup>3</sup>

Applying 4R principles can help you to lower inputs, leading to lower costs, minimizing environmental impact and ensuring sustainable agriculture.



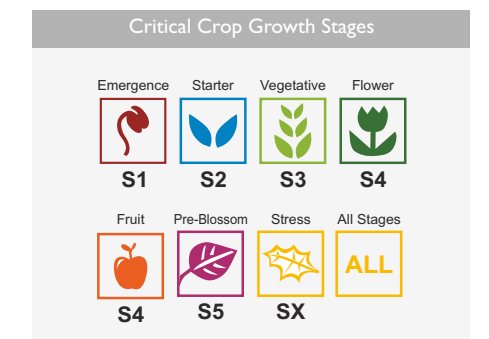
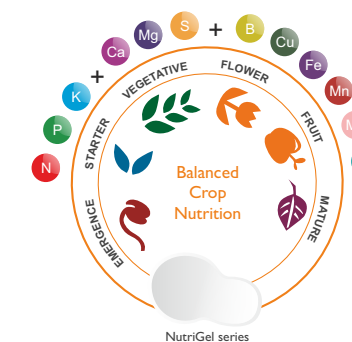
4R Principles : Fertilizer application using the

1. Right Source
2. Right Rate
3. Right Time
4. Right Place

## Crop Stage Specific - Plant Nutrition

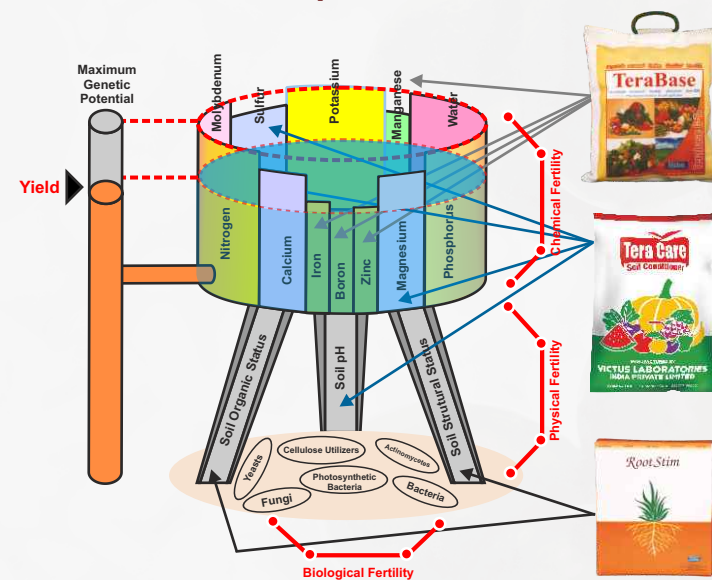
Meeting nutrient requirements during critical growth states of a crop can maximize returns on investment.

NutriGel series (Emergence, Starter, Vegetative, Flower, Fruit and Pre Blossom) provides balanced nutrition as required by specific growth stage of a crop.





## Role of Soil Physical, Chemical and Biological fertility

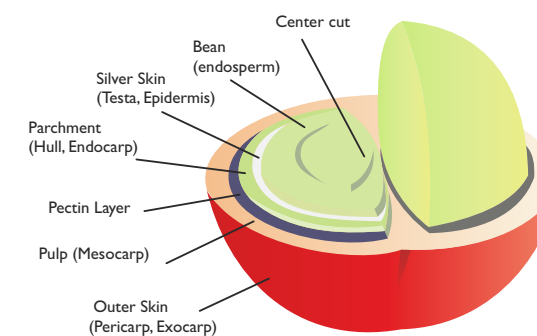


Soil nutrient availability to the plant depends on three pillars -  
Soil pH,  
Soil Organic Status  
Soil Structural Status.

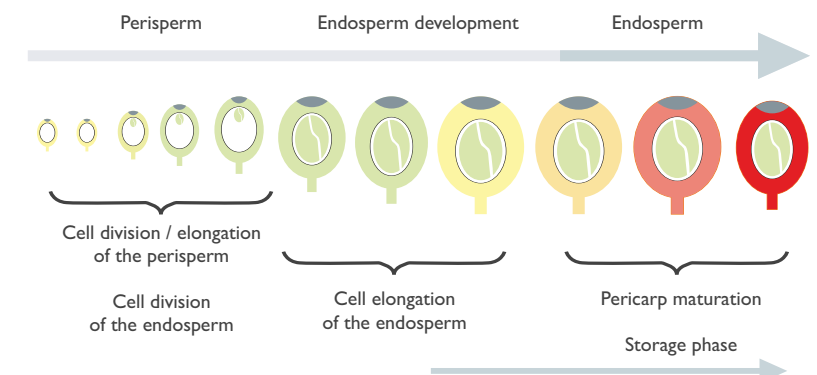
TeraBase provides micronutrients to the plant.  
TeraCare stabilizes Soil pH and provides Calcium (Ca),  
Magnesium (Mg) and Sulfur (S).

RootStim provides the benefits of enhanced organic status at the root zone.  
RootStim increases the Cation Exchange Capacity (CEC) of soil and also increases the water holding capacity. Soil cations in the soil is made available to the plant roots.

## Parts of Coffee Cherry



## Coffee Fruit Development Stages<sup>4</sup>



Fruit development in coffee is a lengthy process with changes in nutrient requirements at different growth periods. Initially the endosperm (true seed) is present in a liquid state and as it ripens during the maturation phase it hardens as a result of accumulation of storage proteins, sucrose and complex polysaccharides the main reserves of the seed. Balanced nutrition is very important during fruit development stage.

## Crop Stage Specific Foliar Nutrition



Pre-flowering

PentaMag @ 1 L + Caljet  
@ 500 gm in 200 L water  
during high temperature conditions.

### PRE MONSOON



Flowering

NutriGel Flower @ 500 ml - 1 L +  
Caljet @ 500 gm in 200 L water just  
before flowering or during flowering.

### POST MONSOON



Fruit Growth

NutriGel Fruit @ 500 ml - 1 L +  
Caljet @ 500 gm in 200 L water  
during Berry development.



Maturity / Harvest



Post Harvest /  
Recovery

NutriGel Pre-Blossom @ 500 ml  
+ Caljet @ 500 gm in 200 L water  
for recovery after harvest.

Foliar spray is the most efficient  
method of providing nutrients  
during critical stages.

## Benefits of NutriGel



Other Liquid  
Micronutrients  
Density < 1.1 gm/cm<sup>3</sup>



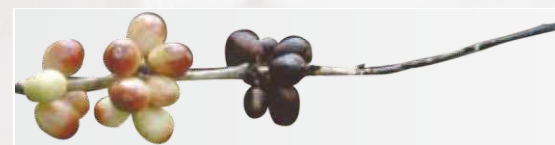
NutriGel  
Density > 1.3 gm/cm<sup>3</sup>

Nutrient Dense Gel  
formulation - More nutrients  
per unit area.

Maximizes foliar application  
efficiency - Benefits of foliar  
surfactant.

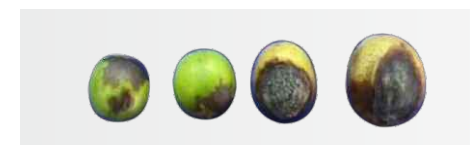
Available for critical growth  
stages - Meets specific nutrient  
requirements.

## Nutrient Deficiency Symptoms in Coffee<sup>5</sup>



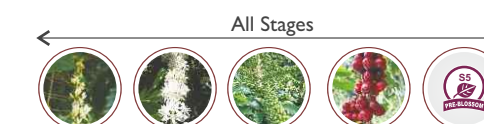
### Overbearing Dieback

Mostly due to poor nutritional status of the plant.



### Berry Blotch

Affected cherries do not pulp easily. Trees  
with poor nutrition are most susceptible.



**Non Stage Specific**  
(General foliar nutrition  
recommended as foliar spray  
for all stages). FloZib Coffee  
is recommended @ 100 ml  
per barrel (200 L water)  
along with Caljet @ 500 gm  
per barrel (200 L water).

Nutrition compatible  
with Bordeaux mixture



FolChel is  
recommended @  
150 gm per barrel  
(200 L water).  
FolChel contains  
non-ionic  
surfactant and  
amino acids.



Pepper Productivity and Importance of Balanced Nutrition

“The mindset that assumes that breeding is the solution to all maladies has to change. Nurturing of plants is several times more important in crop productivity improvement than hybrid seeds per se. A hybrid variety will not produce if planted in non-fertile beach soil. But it will produce several times more if planted in fertile soil.

Brazil learnt this lesson years ago and stopped financing breeding for new varieties. Instead, it scours countries around the world and selects promising varieties to test their adaptability to Brazilian climatic conditions and then provides funding just to do that. It has taken stem cuttings of black pepper varieties from Kerala and spent money and effort on crop production practices. Now Brazil’s pepper yield is 1,500 kg an acre compared to India’s average of 350 kg an acre, the lowest among all pepper-producing countries ”.

- Lux Lakshmanan : India’s food security challenge - The Hindu News Article, Jan 4, 2010.

“Vietnam’s future depends on action taken now. High quality nutrient source + resourceful farmers = balanced nutrition in rice + production of high value crops ”.

- Balanced fertilization for better crops in Vietnam.<sup>6</sup>

“ India cultivates pepper for centuries.Vietnam began cultivating pepper only in 1990’s. Vietnam overtook India in just 10 years and is the world leader now ”.

“ If Vasco Da Gama and his men were to source pepper now, they would skip India and sail straight to Vietnam ”.

- CIFA.<sup>7</sup>

Disorders of Pepper<sup>8</sup>



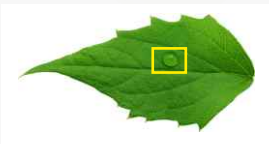
**Symptoms due to Acidic Soil:** Necrotic spots seen along the main veins.This disorder may be increased if root system is damaged by nematodes.



**Intervient Chlorosis:** A symptom due to nutrient deficiency. Balanced nutrition at critical stages maximizes yield.



**Pepper Wilt:** Caused by *Phytophthora capsici*. Predisposing factors include planting pepper in soils that are low in organic matter and nutrients such as calcium, magnesium, and potassium, but high in nitrogen.Vectors such as termites can carry inoculum and infect other vines.<sup>9</sup>



Water Droplet



Water + Ultrawet = Spreading, Penetration and Absorption



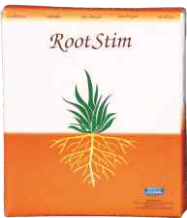
UltraWet improves the efficacy of fungicides by enhancing the spreading and penetration.

Nutrient requirement of Pepper<sup>10</sup>

Nutritional requirement for Pepper is different compared to Coffee. If specific application of NutriGel Pepper is not feasible due to labour and other constraints NutriGel series for coffee (Flower and Fruit) can be applied to pepper vines as foliar spray.



Recommended as foliar spray during transition from vegetative to reproductive stage @ 500 - 1000 ml per barrel (200 L water).



RootStim is helpful in enhancing the organic content around the root zone when applied as a soil drench. It also helps in the recovery of stressed root system.

Control Measures for Wilt

Wilt Starting period

Soil Drenching : Copper oxy chloride  
(500 gm in 200 litres of water)

+  
UltraWet @ 50 ml / barrel (200 L water)

+  
RootStim @ 500 gm / barrel (200 L water)

Pre Monsoon and Post Monsoon

Soil Drenching : Metalaxl - Mancozeb Fungicides :

Ridomil or Matco @ 600 gm in 200L of water  
(use minimum 3-4 gm/L water) + UltraWet

@ 50 ml / barrel (200 L water) + RootStim @ 500 gm / barrel (200 L water)

Apply *Trichoderma* during summer

References

<sup>1</sup> Balanced Fertilization- Key To Grow Fine Coffee. 7th African Fine Coffee Conference & Exhibition Mombasa, February 11th – 13th 2010. Jürgen Küsters and Dirk Schröder, Hanninghof Research Centre, Yara International ASA, Germany. <http://www.eafca.org/afcc7/presentations/Saturday/1430-1610/Juergen%20Kuesters%20-%20Balanced%20fertilization%20-%20key%20to%20grow%20fine.pdf>

<sup>2</sup> Back to Basics - Plant and Soil Nutrition. Nutrient Interaction-Mulders Charts by Des Warrack <http://sites.google.com/site/dcberry69/backtobasics%E2%80%9494plantandsoilnutrition>

<sup>3</sup> 4R principles. International Plant Nutrition Institute. <http://www.ipni.net/4r>

<sup>4</sup> Cytology, biochemistry and molecular changes during coffee fruit development. Renato D.De Castro and Pierre Marracini. Brazil Journal of Plant Physiology, 18(1):175-199, 2006

<sup>5</sup> Coffee Growing Basics: Fertilizer, Disease, Insects. HC 'Skip' Bittenbender, Extension Specialist. CTAHR/UH. College of Tropical Agriculture and Human Resources. University of Hawaii. <http://www.hawaiicoffeeassoc.org/05pdf/Coffee%20basics-%20pests%20disease%20nutrition.pdf>

<sup>6</sup> BALCROP:Balanced Fertilization for Better Crops in Vietnam. Nguyen Van Bo, Ernst Mulert, Cong Doan Sat. 2003, Potash & Phosphate Institute/Potash & Phosphate Institute of Canada (Southeast Asia Programs).

<sup>7</sup> Consortium of Indian Farmers Associations Pepper Presentation. [http://www.indianfarmers.org/PEPPER\\_PRESENTATION.ppt](http://www.indianfarmers.org/PEPPER_PRESENTATION.ppt)

<sup>8</sup> Nutritional Disorders of Pepper. Pepper Production Guide for Asia and The Pacific. Published by the International Pepper Community (IPC) and Food and Agricultural Organization (FAO). <http://www.ipcnet.org/pg/content/11/index.pdf> [http://www.ipcnet.org/images/ipc\\_fao-guide\\_toc.pdf](http://www.ipcnet.org/images/ipc_fao-guide_toc.pdf)

<sup>9</sup> Major Crops affected by Phytophthora. Diversity and Management of Phytophthora in Southeast Asia. Edited by Andre Dreth and David I. Guest. ACIAR Monograph 114. 2004

<sup>10</sup> Nutrient management in black pepper (Piper nigrum L.). Srinivasan, V., Dinesh, R., Hamza, S., Parthasarathy, V. A. CAB Reviews Perspectives in Agriculture Veterinary Science Nutrition and Natural Resources. 2010. Volume: 2, Issue: No. 062, Pages: 01 - 13.