

## MICRO NUTRIENTS

Serial No.	Name	Function	Constituent of	Deficiency Symptoms	Required Regions	Obtained as
1.	IRON. (Ferrous) (Fe)	Electron Transport in Respiration & Photo synthesis. Development of pigments — Chlorophyll & chloroplast. Synthesis of protein	Ferredoxin Cytochrome Nitrogenase	Chlorosis - Interveinal first in young leaves Reduced growth Scorching of leaves Leaf margins & tips.	Every where More along veins	Folic Fe <sup>+++</sup>
2.	MANGANESE (Mn)	Activator of some enzymes — Oxidase — peroxidase — dehydrogenase — kinase — decarboxylase	Component of photo oxidation of water	Chlorosis - Interveinal 1st in older leaves Grey specks & streaks Stunted Growth Stale Flowers	Leaves and Seeds	Mn <sup>++</sup>
3.	MOLYBDENUM (Mo)	Activator of some — dehydrogenase — phosphatase Ascorbic acid synthesis Redox Reaction Nitrogen Metabolism	Nitrogenase, Nitrate reductase	Interveinal Chlorosis 1st in older leaves progressing to younger ones Loosening of inflorescence Slight growth retardation.	Every where Mainly in roots	HMoO <sub>4</sub> <sup>-</sup> MoO <sub>4</sub> <sup>-</sup>



## 6. COPPER (Cu)

- Affects certain enzymes
- Redox reactions,
- Photosynthesis
- Respiration
- Nitrogen metabolism

- Plastocyanine,
- Cytochrome
- RuBP carboxylase & many other enzymes
- Proteins (certain)
- Several enzymes.
- Tyrosinase

- Reduced growth.
- Die back.
- Chlorosis, burning of margins
- Multiple ~~leaf~~ Bud formation
- Grain formation severely restricted
- Blackening of tubers of potato
- Heads are dwarfed.

Enzyme

Cu<sup>++</sup>

## 7. NICKEL (Ni)

- Metalloprotein of
- Urea
- Uric acids.

- Urease
- Hydrogenase

- Necrosis of leaf tip.
- Severe deficiency up to third (3rd) generation may form non-viable seeds & severe anatomical abnormalities.

Ni<sup>++</sup>

## 8. CHLORINE (Cl)

- Production of Oxygen by photolysis of water, cell division
- Osmotic Balance

- Oxygen liberation system of photolysis of water.
- Amylase,
- Anion(-): Cation(+) Balance
- Osmotic potential with sodium & potassium (K<sup>+</sup>)

Enzyme

CHLORINE

(Cl)

Production of Oxygen  
by Photolysis of Water  
→ All Division  
→ Osmotic Balance

Oxygen liberating  
system of Photolysis  
→ Amylase  
→ K<sup>+</sup> & Na<sup>+</sup>  
Anion Cation Balance

Reduced growth  
Wiltling of leaves  
→ Chlorosis and necrosis  
→ Browning of leaves  
→ Abscission of flowers  
→ Fruits reduced

Erryrbhne

Chloride (Cl<sup>-</sup>)