

## Plant Nutrient: Essential Elements for Plant Growth.

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### Introduction

Any chemical compound which supplies plant nutrient or nutrition after application in soil is called plant nutrient.

Any elements which are absorbed by plant from soil, air, and water for their growth and development.

### Function of Essential Elements in Plant

- ❖ **C, H, O** – provide basic structure of plant.
- ❖ (C = 45%, H = 5-6%, O = 45%)
- ❖ C, H, O work as frame elements.
- ❖ It is major constituents of organic matter.

### Function of Primary Plant Nutrients.

#### Nitrogen –

**Symbol:** N; available to plants as nitrate ( $\text{NO}_3^-$ ), and ammonium ( $\text{NH}_4^+$ ) ions.

- ➔ It is providing succulency (soft) and banding power of plants.
- ➔ It is major portion of protein, amino acid and nucleic acid.
- ➔ It is essential elements for chlorophyll and photosynthesis.
- ➔ It is providing late maturity of crops.

➔ Excess dose of nitrogen creates more disease and pest susceptibility.

➔ It is improving the quality and quantity of dry matter in leafy vegetables and protein in grain crops.

#### Phosphorus –

**Symbol:** P; available to plants as orthophosphate ions ( $\text{H}_2\text{PO}_4^-$ ,  $\text{HPO}_4^{2-}$ ,  $\text{PO}_4^{3-}$ ).

➔ It is help in energy storage and translocated.

➔ It is major portion of protein, amino acid and Fat.

➔ It is helpful for formation of phospholipids, nucleic acid and chitin.

➔ It is essential for development of root.

#### Potash –

**Symbol:** K; available to plants as the nitrate ( $\text{NO}_3^-$ ), and ammonium ( $\text{NH}_4^+$ ) ions.

#### Potash –

**Symbol:** K; available to plants as the ion  $\text{K}^+$

➔ Increase availability of nitrogen and phosphorus.

➔ Help in transport of manufactured food material (carbohydrate, glucose, starch)

➔ It is helpful for formation protein.

➔ It is providing insect, disease and drought resistance.

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- ➔ It is providing logging of plant.
- ➔ Is help in opening and closing of stomata.
- ➔ Is help in sinning of grain.

### Function of Secondary Plant Nutrients.

#### Calcium –

**Symbol: Ca;** available to plants as the ion  $\text{Ca}^{++}$

- ➔ It is a structural component of chromosome.
- ➔ It is a major element of middle lamella.
- ➔ It is increasing cation in cell shape.
- ➔ It is also known as cation balancing elements.

#### Magnesium –

**Symbol: Mg;** available to plants as the ion  $\text{Mg}^{++}$

- ➔ It is a major portion of chlorophyll.
- ➔ It helps of chlorophyll formation in plant.
- ➔ It is important for green fodder crop.

#### Sulphur –

**Symbol: S;** available to plants as the sulfate ion,  $\text{SO}_4^{--}$

- ➔ Sulphur is a major portion of essential elements for oilseed crop.
- ➔ It also important element for garlic and onion.
- ➔ It helps formation of cysteine, cystine and methionine amino acids.
- ➔ It creates pungency in Onion and Garlic.

### Function of Plant Micro-nutrients.

#### Iron –

**Symbol: Fe;** available to plants as  $\text{Fe}^{++}$

- ➔ It helps in oxygen carrier.
- ➔ It provides oxidation and reduction process inside the plant.

#### Manganese –

**Symbol: Mn;** available to plants as

$\text{Mn}^{++}, \text{Mn}^{+++}$

- ➔ It is primarily functions as part of the plant enzyme system, activating several metabolic functions.
- ➔ It is involved in the oxidation-reduction process in photosynthesis.
- ➔ It is help in photolysis of water in photosynthesis.

#### Zinc –

**Symbol: Zn;** available to plants as

$\text{Zn}^{++}$

- ➔ It works as enzyme regulator.
- ➔ Zn has a role in RNA and protein synthesis.

#### Chlorine –

**Symbol: Cl;** available to plants as the

chloride ion,  $\text{Cl}^-$

- ➔ It is essential in photosynthesis, where it is involved in the evolution of oxygen.
- ➔ It is help in photolysis of water in photosynthesis.
- ➔ It is increasing cell osmotic pressure and the water content of plant tissues.

- ➔ It is found in many bacteria and fungi.
- ➔ It is reducing the severity of certain fungal diseases.

e.g., take-all disease of wheat.

## Boron -

**Symbol:** B. Available to plants as borate,  $\text{BO}_3^{3-}$

- ➔ It helps pollen grain formation in androecium plant.
- ➔ It helps transporting of carbohydrate, sugar, and starch.

## Molybdenum –

**Symbol:** Mo; available to plants as molybdate,  $\text{MoO}_4^{2-}$  is required by some soil microorganisms for nitrogen fixation in soils.

- ➔ It is help in nitrogen fixing in legume crops.
- ➔ It is a major portion of leghemoglobin. (roots – pulses)
- ➔ It is a necessary component of two major enzymes in plants, nitrate reductase and nitrogenase,

## Copper-

**Symbol:** Cu; available to plants as the ion  $\text{Cu}^{++}$

- ➔ It is essential in several plant enzyme systems involved in photosynthesis.
- ➔ It is part of the chloroplast protein plastocyanin, which forms part of the electron transport chain.

- ➔ It is role in the synthesis and stability of chlorophyll and other plant pigments.

## References

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