

NEET Biology Short Notes

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GENERAL FUNCTION OF MINERAL ELEMENTS

- 1. C, H, O, N, K, S, Ca, Mg: Formation of the plant body.
- 2. Na, Ca: Influence permeability of cytoplasmic membranes.
- 3. Cu, Fe, Zn, Mg, Co, Mn: Catalytic effects in plants.
- 4. Ca, K, Mg: Balancing effect.
- 5. Na+, K+, Ca++, Mg++: maintain electrostatic neutrality.
- 6. B, K: Phloem transport.
- 7. As, Hg, Cu: toxic effects upon protoplasm.

Element	Function
Carbon	Frame work element, protoplasmic element, Storage element, non-mineral element.
Hydrogen	Frame work element, protoplasmic element, non- mineral element.
Oxygen	Frame work element, protoplasmic element, non-mineral element
Nitrogen	Protoplasmic element, storage element, critical element, mineral and non-mineral element.
Sulphur	Protoplasmic element, storage element
Phosphorus	Protoplasmic element, storage element, critical element
Iron, copper, zinc, manganese, molybdenum	Catalytic elements.
Magnesium	Catalytic element, balancing element,
Potassium	Catalytic element and critical element.
Calcium	Balancing element
Arsenic, mercury, lead, silver	Toxic elements

Macronutrients

1. Nitrogen

Functions of Nitrogen

Absorbed by plants as NO₃⁻, NO₂⁻ or NH₄⁺; Required by metabolically active cells and meristematic tissues of plants. The major constituent of proteins, purines, pyrimidines, vitamins, chlorophyll, and hormones. Nitrogen from older yellow leaves passes to younger leaves in the form of amides and amines. It is also present in coenzymes like NAD, NADP.

Deficiency Symptoms of Nitrogen

1. Yellowing of leaves known as Chlorosis. 2. Reduced cell division causes stunted growth and dormant lateral buds. 3. Protein content decreases with an increase in starch content. 4. Late flowering. 5. Shoot axis shows purple coloration.

2. Phosphorus

Functions of Phosphorus

Found in phospholipids, nucleic acids, ATP, nucleotides, sugar phosphates, etc. in photosynthesis. Required for all phosphorylation reactions. Absorbed by the plants as phosphate ions like H PO_2^4 – or HPO_4^{2-} . Also found in cell membranes & few proteins.

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Deficiency Symptoms of Phosphorus

1. Vascular tissues reduce in some plants like tomato. 2. Red pigmentation of leaves. 3. Carbohydrate accumulation in Soya-bean. 4. Stunted and slender stems in young plants.

3. Potassium

Functions of Potassium

Required for stomatal opening. Maintain cation-anion balances in the cell. Maintain cell turgor. Help inactivating enzymes. Sugar translocation. Protein synthesis.

Deficiency Symptoms of Potassium

1. Increased rate of respiration. 2. Plastid disintegration. 3. Loss of cambial activity and apical dominance. 4. Marginal chlorosis. 5. Necrosis of margins, leaf tips etc. 6. Increased bending towards the ground.

4. Calcium

Functions

Required by differentiating and meristematic tissues. Formation of the mitotic spindle. Synthesize calcium pectate in middle lamella of the cell wall. Activates enzymes like kinases, dehydrogenases etc. Participate in the normal functioning of cell membrane.

Deficiency Symptoms

1. Chlorosis. 2. Deformation of young leaves. 3. Stunted growth. 4. Necrosis in young meristematic regions.

5. Magnesium

Functions

Divalent Mg²⁺ is absorbed by plants. Constituent of ring structure of chlorophyll. Activates enzymes of photosynthesis, respiration etc. Maintains ribosome structure and chromatin fibre. Also activates enzymes required in synthesis of DNA and RNA.

Deficiency Symptoms

1. As leaves get old, they start having purple spots. 2. Chlorosis in the veins of leaf. 3. Premature abscission of leaves.

6. Sulphur

Functions

A constituent of many coenzymes, vitamins, 2 amino acids cysteine and methionine. Plants require Sulphur in stem, root tips and young leaves. Sulphur containing volatile oils give a pungent smell to onion, mustard etc. Forms disulphide bond between 2 cysteine residues to form a cystine.

Deficiency Symptom

Stunted growth. 2. Chlorosis in young leaves. 3. Premature development of lateral buds.
Inhibited growth of terminal buds.

Micronutrients

1. Iron

Functions

Proteins that are involved in the transfer of electrons like ferredoxin and cytochromes have iron as a constituent. Plants obtain it as Fe3+. Essential in the synthesis of chlorophyll. Activates enzymes used in respiration and photosynthesis. Carries oxygen in animals as Hb is made up majorly of iron.

Deficiency Symptoms

1. Stunted growth. 2. Anaemia in animals. 3. Chlorosis in young leaves.

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2. Molybdenum

Functions

Essential in protein synthesis in plants. Helps in increased photosynthesis. Also enhances nitrogen fixation in legumes. Animal fertility. Enzymes like nitrogen's and nitrate reductase that play a role in nitrogen metabolism consist of molybdenum.

Deficiency Symptoms

1. Necrosis of leafs at tips and edges 2. Low reproductivity in animals. 3. Chlorosis of older leaves. 4. Irregular leaf blade formation. 5. Legumes face inhibited/slow growth.

3. Boron

Functions

Help in cell elongation and differentiation. Required in RNA and DNA synthesis. In plants, it is needed by pollen tube, root tips etc. and is taken up as BO3 or BO4.

Deficiency Symptoms

1. Necrosis of young leaves. 2. Fruit malformation. 3. Retarded growth. 4. Brittle stems.

5. Distorted leaf blades.

4. Copper

Functions

Found in enzymes that play roles in plant growth and reproduction. Needed for chlorophyll production and its synthesis. Works as a catalyst for plant GH i.e., auxins.

Deficiency Symptoms

1. Necrosis of young leaves. 2. Deformation of young leaves. 3. Reduced seed production in grains. 4. Infertility, reduced milk production, anaemia, fragile bones in animals. 4. Cattles may suffer from cardiovascular diseases.

5. Manganese

Functions

Activates enzymes involved in photosynthesis, nitrogen metabolism, reproduction, and respiration. Required for synthesis of chlorophyll.

Deficiency Symptoms

1. Mortality. 2. Chlorosis of old leaves.

6. Zinc

Functions

Required for synthesis and functioning of chlorophyll. Activates enzymes like carboxylases. Works as a catalyst for plant growth regulator i.e., auxin. Needed in the functioning of enzymes that play role in reproduction and growth of plants and animals.

Deficiency Symptoms

1. Deformed, dark green leaves. 2. Stunted growth. 3. Necrosis of older leaves. 4. Short internodes in plants. 5. Loss of hair, cracked skin in animals.

7. Chlorine

Functions

Helps in determining an ion-cation balance in cells & Na $^+$ and K $^+$ content in the cell. Helps in Photolysis of Water.

Deficiency Symptoms

1. Chlorosis and Necrosis of leaves. 2. Bronze coloured leaves.

8. Selenium

Functions

Essential to animals only. Produces antibodies. Helps in disease resistance. Prevents liver necrosis in pigs, white muscle disease of livestock etc.

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Deficiency Symptoms

Liver necrosis in pigs. 2. White muscle disease in livestock. 3. Stiff-lamb disease.
Embryonic immortality. 5. Infertility.

9. Nickel

Functions

Help in germination. The Early seedling growth of jack bean seeds. Has urease and hydrogenase activity.

Deficiency Symptoms

It causes Necrosis spots.

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