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Identification and Use: Natural Plant Growth Regulators and Micronutrients



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- In organic farming chemical fertilizers are not allowed and only organic manures and organic fertilizers are allowed.
- whatever might be the nutrient requirement of the crops, it has to be supplied through organic sources only.
- Generally organic sources are referred as complete plant food as they contain all the essential plant nutrients.



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- Different nutrient management practices followed in organic farming for secondary and micronutrient management are application of FYM, compost, oil cakes, liquid organic manures, biofertilizers, animal manures and organically approved amendments, cropping system management viz., green manures (One season in a year), crop rotation, intercropping, crop residues management as mulch.



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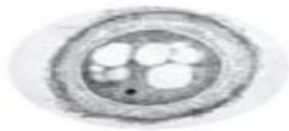
Microbial fertilizers

- The microbial fertilizers mostly consist of organic material and some source of sugar or starch, which are fermented together with specific species of microorganisms. The products are living organisms and need to be applied cautiously. They should not be used when expired, since the organisms may be dead.



Rhizobium

- A bacterium.
- Lives in soil, around and inside of the roots of legumes.
- Forms a symbiosis with leguminous plants.
- Fixes atmospheric nitrogen.



Azotobacter

- A bacterium.
- Lives free in the soil.
- Can fix nitrogen.



Azospirillum

- A bacterium.
- Lives in soil.
- Is able to live on its own in soil, or in close associations with plant roots.
- A brasilense is able to fix nitrogen.



Pseudomonas

- A diverse group of bacteria.
- Can use a wide range of compounds that plants give off when their roots leak or die.
- Various functions: e.g. Solubilizing phosphorus and making it available.



Mycorrhiza

- A fungus-root symbiosis. Lives with the roots of nearly all plants.
- Lives in the root and extends itself into the soil.
- Helps the plant by gathering water and nutrients.
- Improves soil structure.



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- Most of the bacteria and fungi present in the purchased products are generally present in soil. Microbial inocula, therefore, enhance the presence of the specific organisms. Some farmers make their own microbial fertilizers to save on costs.

Plant growth regulators :

Plant growth regulators may be defined as any organic compounds, which are active at low concentrations (1-10 ng / nl) in promoting, inhibiting or modifying growth and development.



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Classification:

1. Auxin
2. Gibberellin
3. Cytokinenin
4. Etylene
5. Dormins (Abscissic Acid (ABA), Phaseic Acid)
6. Flowering Hormones (Florigin, Anthesin, Vernalin)
7. Phenolic Substances (Coumarin)
8. Miscellaneous Natural Substances (Vitamins, Phytochrome Tranmatic Substances)



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9. Synthetic Growth Retardants (Ccc, Amo, 1618, Phosphin - D, Morphactin, Malformis)
10. Miscellaneous Synthetic Substances (Synthetic Auxins, Synthetic Cytokinins)



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Role of plant growth regulators in organic horticulture

1. Cell divisions and enlargement Eg. cambial growth in diameter- IAA + GA
2. Tissue culture – Shoot multiplications (IBA and BAP), callus Growth (2,4,-D), root multiplication IAA and IBA (1-2 mg)
3. Breaking dormancy and Apical dominance – NAA
4. Shortening internode – Apple trees (NAA) (dwarf branch-fruit)



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Mineral fertilizers

The mineral fertilizers, which are allowed in organic horticulture, are based on ground natural rock. However, they may only be used as a supplement to organic manures. If they contain easily soluble nutrients, they can disturb soil life and result in unbalanced plant nutrition. In some cases, mineral fertilizers are ecologically questionable as their collection and transport is energy consuming and in some cases natural habitats are being destroyed.

Fertilizer	Origin	Characteristics	Application
Plant Ashes	Burned organic material	• Mineral composition similar to plants • Easy uptake of the minerals • Wood ashes rich in K and Ca	• To compost (best) • Around the base of the plants
Lime	Ground limestone, algae	• Buffers low pH (content of Ca and Mg secondary) • Algae: rich in trace elements	• Every two to three years when soil-pH is low (avoid excessive use: reduction of availability of P, more deficiencies of micro-nutrients)
Stone Powder	Pulverised rock	• Trace elements (depending on the composition of the source) • The finer the grinding the better the adsorbance.	• To farmyard manure (reduces volatilisation of N and encourages the rotting process)
Rock Phosphate	Pulverised rock containing P	• Easily adsorbed to soil-minerals • Weakly adsorbed to organic matter • Slow reaction	• To compost • Not to reddish soils (irreversible adsorption)