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FASCINATION OF GROWTH REGULATORS IN PLANT GROWTH

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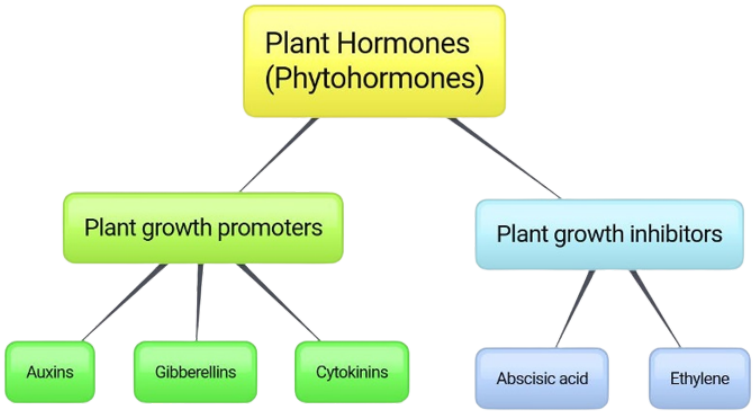
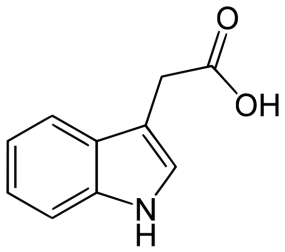
Plant growth regulators were first used in agriculture in the United States in the 1930s. Ethylene, a naturally occurring chemical, was one of the first plant growth regulators to be discovered and effectively employed for increasing pineapple flower production. It has minimal harmful effects on humans. Plant growth regulators have been used extensively in contemporary agriculture since their introduction, and synthetic compounds that replicate naturally occurring plant hormones have been developed.



Auxins were the first plant hormones to be discovered and studied

Auxins:

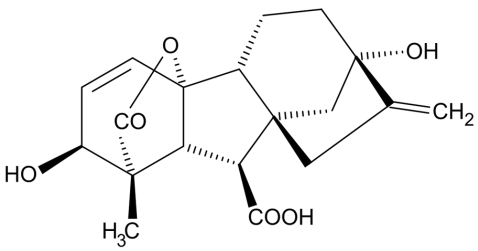
Auxins are useful in tissue and organ culture for cell elongation and cell division. They are necessary for coleoptile and stem growth and encourage secondary growth. Auxins, which are essential for apical dominance, aid in the start of adventitious roots in cuttings. It causes plants to produce more female flowers while producing fewer male blooms, as well as preventing premature fruit drop and delaying leaf abscission. Auxins are also important in extending dormancy.



Gibberellins were discovered originally in Japan

Gibberellins:

Gibberellins are necessary for root, stem, leaf, and coleoptile growth. It helps to break dormancy by stimulating amylase production. Gibberellins aid in seed germination, flowering induction, cell division promotion, and genetic dwarfism. Reducing androecium growth, can prolong senescence in leaves and citrus fruits and induce sterility in plants.

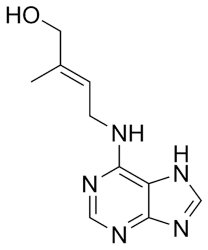


The movement of cytokinins is passive – it does not require energy!

Ethylene is a particularly interesting plant hormone because it exists as a gas

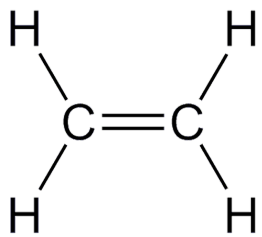
Cytokinin:

Cell division, lateral bud development, and apical dominance are all stimulated by cytokinins. On cortical cells of tobacco roots, it promotes cell elongation many times. It promotes chloroplast formation in callus tissues of excised cotyledons when used exogenously. Potato stolons are elongated, and tuber development is inhibited. It also resists senescence by preventing the degradation of metabolites like proteins, nucleic acids, lipids, and chlorophylls in the leaves.



Ethylene:

In barley and other cereals, ethylene promotes seed germination. It promotes root and shoots growth, as well as differentiation. Inhibits longitudinal growth of the stem, but induces lateral growth, resulting in an increase in stem girth. Ethylene, like auxin, inhibits the growth of lateral buds, resulting in apical dominance. It hastens the abscission of both vegetative (leaves, stems) and productive (flowers, fruits) sections of plants.



Plants produce a chemical messenger, called abscisic acid, to alert the rest of the plant that it is water stressed

Abscisic Acid:

Seed germination, root, stem, leaf, and coleoptile growth are all inhibited by abscisic acid. In several species, it causes seed and bud dormancy. Under drought conditions, ABA builds up in plants, causing stomata to close, and preventing additional water loss. It causes seeds to synthesise protein storage and increases senescence and abscission of leaves, flowers, and fruits.