



Role of Recent Chemicals Including Phyto Hormones in Increase Production of Cole Crops

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Abstract

There are 2 main categories of chemicals that are used in agriculture that are fertilisers and pesticides. And the type of chemicals used are herbicides, Insecticides, Fungicides, rodenticides, Larvicides, Molluscicide, Bactericide, Algacides. Here Phytohormones also plays a major role in increasing the production of the Cole crops. The Phytohormones are grouped into 2 parts (a)plant growth promoters and (b)plant growth inhibitors. Different Phytohormones have different functions in the plant growth or plant development.

Introduction

Cole crop means stem or stalking part of the plant Which are generally belongs to the family *Brassicaceae* or *Cruciferae*. Broccoli, cabbage, and cauliflower are known as Cole crops. Several other vegetables belong to this group, including Brussels sprouts, Chinese cabbage, and kohlrabi, but these are considered minor vegetables. Cole crops are cool season vegetables that grow best at temperatures between 60 F and 68F.

Types of chemicals which helps in increase production of Cole crops?

- Common agricultural chemicals (agrchemicals) include fuels, solvents, insecticides, herbicides, fungicides, fertilisers and veterinary chemicals.
- The 2 main categories of chemicals used in agriculture are: Fertilisers and Pesticides, including insecticides, herbicides and fungicides.

Types of Chemicals

Herbicides

- Herbicides prevent the growth of weeds that can leach the nutrients required by the crops for growing.
- Furthermore, *2,4-D*, *Glyphosate*, *Bentazon*, and *Clethodim* are a few types of pesticides which are a part of herbicides in agriculture.

Insecticides

- As the name suggests, insecticides attack the nervous system of insects to restrict their inhibition or breeding.
- *Organophosphate*, *Carbamates*, *Nicotinoids*, *Fumigants*, and *Biorational* are a few types of pesticides used as insecticides.

Fungicides

- Fungicides help prevent fungi's growth and help remove them completely. Also, they can easily decay in the soil in the presence of air.
- *Maneb*, *nabam*, and *cycloheximide* are a few types of pesticides used as fungicides.

Rodenticides

- They are chemical substances used to control the inhabitation of rodents such as rats, mice, gophers, and even fish, birds, and mammals that can destroy crops.
- Moreover, *Chlorophacinone*, *diphacinone*, *brodifacoum*, and *bromadiolone* are a few examples of rodenticides.

Larvicides

- Larvicides are pesticides that control or restrict larvae or mosquito growth or restart their breeding to prevent vector-borne diseases like malaria.

Molluscicides

- Pesticides that typically restrict the inhabitation or spreading of molluscs such as snails, slugs and others.

Bactericides

- Pesticides kill or restrict the spreading of harmful bacteria throughout crops and livestock.

Algaecides

- These pesticides kill or restrict the growth of algae for better crop yield.

Phytohormones

Phyto hormones are also known plant hormones. These are the organic substances which are produced in the plants. They bring about total control over growth and other physiological functions in the organism. The Phyto hormones are otherwise called as plant growth regulators. Different growth regulators are present in the plant. The 5 major classes are Auxins, Gibberellins, Cytokinin's, Ethylene and abscisic acid. **Went and Thimann coined the term Phytohormones and used it in the title of their 1937 book.**

PLANT GROWTH PROMOTERS: Plant growth promoters are plant hormones that lead to the development and growth of plants. Salicylic Auxins, Gibberellins, Cytokinin and acid.

PLANT GROWTH INHIBITORS: The inhibitors are employed to keep the size and shape of the plants as well as control fruit production. "These regulators would mostly be employed on ornamental plants, flowers, and trees that aren't easily genetically altered," Murphy explained. Ethylene, Abscisic acid and Jasmonate.

FUNCTION OF PHYTOHORMONES:

Auxin: Involved in differentiation of vascular tissue, control cellular elongation, prevention of abscission, involved in apical dominance and various tropisms, stimulate the release of ethylene, enhance fruit development.

Cytokinin: Affect cell division, delay senescence, activate dormant buds.

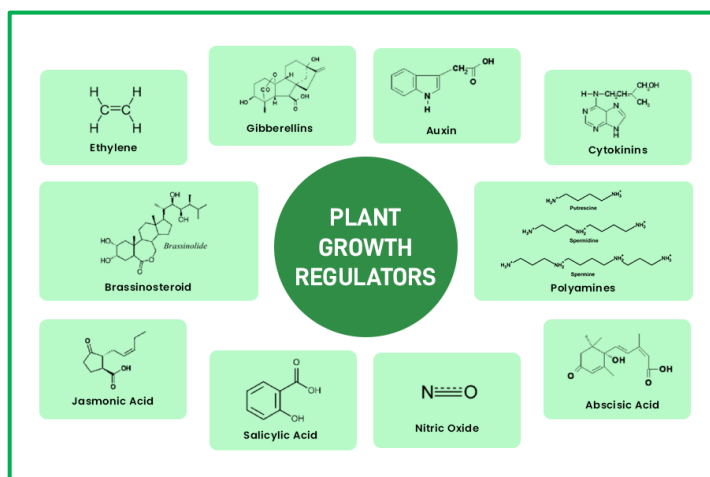
Gibberellin: Initiate mobilization of storage materials in seeds during germination, Cause elongation of stems, stimulate bolting in biennials, stimulate pollen tube growth.

Brassinolides: Promote of elongation, stimulate flowering, promote cell division, can affect tropic curvature.

Salicylic Acid: Activates genes involved with plant's defense mechanisms.

Jasmonates: Involved in response to environmental stresses, control germination of seeds.

Ethylene: Causes ripening of climacteric fruits, promotes abscission, determines sex in cucurbits.



Abscisic acid: Maintains dormancy in seeds and buds, stimulates the closing of stomata.

Effect of Phyto hormones in Cole crops

Cauliflower: GA₃ and NAA at different levels as dipping of roots and foliar spray on “SNOWBALL-16” Variety of cauliflower. It was reported that foliar spray of GA₃ at 50mg/l in cauliflower gave better results for diameter of curd (17.78 cm), length of stalk (5.22 cm), net weight of curd (3.53 kg/plant), curd yield (12.5 kg/plot) and required minimum days to 50% marketable curd (88.80 days) was reported by sitapara *et al.*, (2011). Jadon *et al.*, 2009 used different dose of NAA@ 100, 120 and 140 ppm. They revealed that higher dose of @ 140ppm gave higher plant height (33.83 cm), diameter of the stem (1.65 cm), spread of the plant (45 cm) and number of leaves per plants (22.10). Yield attributing characters viz., diameter of curd (15.10 cm), weight of curd per plant (0.61 kg), length of head per plant (21.58 cm), yield (155 q/ha) and dry weight of curd per 100g of fresh weight (10.40) were also increased than control.

Cabbage: Islam et al., 2017 used different concentrations of GA₃ on cabbage. They took four different levels of GA₃ such as 0, 90, 120 and 150 ppm. They reported that GA₃ at 120 ppm gave highest marketable yield (65.5 t/ha) while minimum yield was recorded in GA 0 ppm (41.2 t/ha). Highest plant height, maximum number of loose leaves per plant and diameter of head was recorded by using GA₃ at 120 ppm while minimum in GA 0 ppm. On the other hand, minimum days were recorded for formation of head in GA 120 ppm and maximum days was recorded in GA 0 ppm. So, they found that GA₃ at 120 ppm was more effective. Chaurasiy et al., (2014) used different concentrations of NAA (40, 80 and 120 ppm) and GA₃ (30, 60 and 90 ppm) and applied as foliar spray on plants of cabbage at 30 and 45 days after transplanting. They reported that NAA 80 ppm and GA₃ 60 ppm gave highest plant height, number of leaves per plant, plant spreading, diameter of stem, weight of plant, weight of head, and head yield as compared to all the other treatments and control.

Key Words: Phyto hormones, *Brassicaceae*, *Cruciferae*, GA₃, NAA, Auxins, Gibberellins, Cytokinin, Abscisic acid

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