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Recognize the PGRs Utility: for increasing vegetable productivity

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Introduction

In modern agriculture, people have established the benefits of extending the use of hormones to regulate growth, flowering, fruiting of plants and shelf life of vegetables (fruits and flowers). When natural or synthetic substances used in this manner, they are called as Plant Growth Regulators collectively. PGRs are organic substance other than nutrients and vitamins with regulate the growth of plants when applied in precise manner. The Plant Growth Regulators (PGRs) are used in small quantity, play a vital role in increased growth and enhanced productivity of vegetables. The initial treatment influences early establishment of seedlings and survival under natural conditions, improving yield and yield as well as quality attributing characters.

Plant Growths Regulators for important vegetables Crops:

Chilli (Capsicum annum): Treatment of Planofix (NAA) @ 10 ppm at the flowering stage increases the number of branches and reduces flower drop. Soil drenching with Triacontanol 1 ppm after 18 & 43 days, improve the plant growth. Application of GA3, NAA & Cycocel just after the fruit set stage increases the chilli fruit set.

Crop	Name of PGR / Concentration.	Time & Method of Application	Effects on crop
Chilli	Planofix (NAA) 10 ppm	At flowering & three weeks later(Spray)	Increase the number of branches Reduced flower drop
	Triacontanol 1ppm	18 & 43 day after planting(Soil drenching)	Improved plant growth
	Ethrel 300-500ppm Cycocel 500-2000 ppm	4 weeks after Transplanting	Decrease plant height & increase number of branches
	Chloroflurenol 500-2000 ppm	4 weeks after Transplanting	Increase number of secondary branches
	GA3 10-100ppm NAA 20-200 ppm Cycocel 1000ppm	Just after fruit set	Increased fruit set

Table-1 PGR, their application and effect on chilli crop

Tomato (Lycopersicum esculentum L.)

The PGRs laced with the epitome of panacea is very useful to enhance fruit setting in tomato. A sequence of process including pollination, germination of pollen-grains, pollen tube growth, fertilization and fruit initiation must take place successfully. For example if Tomato day temperature over 32 degree Celsius, night temperature over 21 degree Celsius and below 10 degree Celsius reduce fruit setting.

Treatment of Tomato seedlings with unicanazole or ABA decreases water loss from seedlings 5 days after treatment. Treatment of Tomato seedlings with 500 ppm Cycocel creates salinity resistance in plants with improved yield.

Applying ABA to Capsicum seedlings immediately before transplanting reduces transplant shock and increases yield.

The plant growth regulators are very useful in improving the strength to seedling for survival under abiotic stresses.The application of Para-chloroPhenoxy Acetic Acid (PCPA) @ 100 ppm at profuse flowering stage is must conducive and economical for increasing fruit setting & early yield. The seed treatment with Cycocel @ 500 ppm enlarges the fruit size.

Crop	Name of PGR / Concentration.	Time & Method of Application	Effect on crop
Tomato	B-naphthoxy acetic acid (BNOA) 25-50 ppm GA3 5-20 ppm	Seed treatment	Improved growth & yield
	Chlorophenoxy acetic acid 10-20 ppm	Seedling soaked for 24 hours	Early & higher fruit set & increased yield
	NAA 0.1 ppm	Foliar application	Increase fruit yield
	GA3 10 ppm NAA 1000 ppm PCPA 50 ppm Cytozyme 1.25%	Foliar spray	Improved fruit set in summer

Table-2 PGR, their application and effect on tomato crop

Gourds:

The treatment of Ethrel @ 10-150 ppm at the 2 and 4 leaf stages (spray) increases the number of fruits and fruiting yield in the Bottlegourd and Bittergourd. The first spray at 2 and Second spray at 4 leaf stage of the Cycocel/ MH 50 -150 ppm, increases theFemale: Male ratio.

Crop	Name of PGR / Concentration.	Time & Method of Application	Effect on crop
Bottle gourd	Ethrel 100-150 ppm MH 400 ppm/ Triodobenzoic acid (50 ppm) Boron 3-4 ppm	2 & 4 true leaf stage First spray at 2 & second spray at 4 true leaf stage	Increased the fruiting yield
Bitter gourd	Cycocel /MH 50-150 ppm	2 & 4 true leaf stage First spray at	Increase female: male ratio
	GA3 60 ppm Ethrel 100-150 ppm GA3 25 Mg / litre	2 & second spray at 4 true leaf stage Soaking of seeds 2 & 4 true leaf stage (spray)	Increased no. of seed/fruit

Table-3 PGR, their application and effect on gourds

Cucumber:

In monoecious cucurbits, ratio of male and female flower is quite sparse. The male flowers appear first and sometimes there is a big gap before the female flower appearance. For example in cucumis, firstly only male flowers are formed then both male and female flowers and finally almost only female flowers are produced.

The exogenous application of PGR is able toshift the sex expression towards femaleness by increasing the production of pistillate flowers and suppressing that the staminate flowers. The experimental results involving cucumber Green long reveals that application of Ethrel @ 200ppm at 2 and 4 true leaf stage is quite effective in stimulating the production of pistillate flowers and enhancing the yield.

Crop	Name of PGR/ Concentration	Time & Method of Application	Effect on crop
Cucumber	Ethrel 150-200 ppm	2 & 4 true leaf stage First spray at 2 & second spray at 4 true leaf stage	Increased number of female flowers

Table-4 PGR, their application and effect on cucumber crop

Melons:

PGRs are good if used timely for getting higher yield with quality produce. They need to be applied at proper growth stage. The application of Ethrel @ 250ppm and Silver Thiosulphate (STS) @ 400 ppm at the 2 and 4 true leaf stage induces male flowers in gynoecious muskmelon and increases fruiting whereas in the case of watermelon spray of TIBA @25-250 at the time of 2 and 4 true leaf stage increases the fruiting yield.

Crop	Name of PGR / Concentration.	Time & Method of Application	Effect on crop
Muskmelon	Ethrel 250 ppm Silver Thiosulphate (STS) 300-400 ppm SADH 5000 ppm	2 & 4- true - leaf stage First spray at 2 & second spray at 4 true leaf stage Soaking of seed	Increased fruiting Induced male flowers in gynoecious muskmelon Make plant Bushy with More pistillate flower
Watermelon	TIBA 25-250 ppm Boran 3-4 ppm, MO 3-4 ppm Calcium 20-25 ppm	2 & 4 true leaf stage First spray at 2 & second spray at 4 true leaf stage	Increased the fruiting yield

Table-5 PGR, their application and effect on melons

Onion:

The root dipping of seedlings of onion with 60 ppm GA3 solution gives more yield. Spray of Maleic Hydrazie (MH) @ 1500-2500 ppm after 75-90 days of transplanting reduces sprouting of bulb during storage of onion.

Crop	Name of PGR / Concentration.	Time & Method of Application	Effect on crop
Onion	Maleic Hydrozide (MH) 1500-2500 ppm	Spray at 75-90 days after transplanting	Reduced sprouting of bulb during storage

Table-6 PGR, their application and effect on onion crop

References

Pandey, A. K. and Mathura Rai (2006) . Use of Plant Growth Regulators For Quality Vegetables. Indian Horticulture ; May-June 2006, 28-29.

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(1)

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Image 1 &2- PGR utilization in tomato & cabbage crop.