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EFFECT OF GROWTH REGULATORS ON GROWTH AND YIELD OF CHILLI (CAPSICUM ANNUUM.L) CV. K2

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Abstract:

The Experiment was conducted during 2007, in the Vegetable Unit, Department of Horticulture, Faculty of Agriculture, Annamalai University. The experiment was laid out in Randomized Block Design with three replications and nine treatments of growth regulators. The study revealed that the foliar application influenced on the growth and yield attributing character of chilli over control. The result exhibited that the growth regulators namely NAA and brassino steroid foliar spray during flower bud initiation stage was found to be beneficial for increasing the plant height, number of branches per plant and Dry matter production compared to control. With brassio steroid to yield contributing character i.e. Number of flowers per plant fruits setting percentage, fruit length, fruit girth, average fruit weight, number of fruit per plant, and fruit yield per plant showed increase in foliar spray of brassio steroid 1 ppm than all other treatment including control.

Introduction:

Chilli (*Capsicum annuum* L.) is one of the most important commercial vegetable and spice crop grown in India. Being grown in tropical and sub-tropical region it requires a warm humid climate. Fruits are available in the market throughout the year, India is the largest producer of chilli in the world and it is the second largest producer next to China. The fresh and dried fruits of chilli contain phenolic acid compound "capsaicin" in the placenta which is responsible for the pungency in chilli. The bright red colour at the ripening stage is due to the pigment capsanthin. It is rich source of vitamin A and C. Chilli fruits having deep red colour, without pungency are used as paprika. A group of chemical known as plant growth regulators, plant hormones and growth inhibitors had found many practical controlling implications in growth and many other physiological activities and metabolic processes of the plants. The growth regulators or promoters like brassino steroid and stimulate vegetative growth and are involved in the initiation of cell division. Plant growth regulators are considered as new generation of agrochemicals after fertilizers, pesticides and herbicides to augment yield and quality. The plant growth regulators are known to enhance the source sink relationship and stimulate flowers and fruits. Besides this, the growth regulators have the ability to cause accelerated growth in plants. The use of plant growth regulators is one of the most important tools in hands of agriculturists with above consideration; keeping in view an experiment was planned on "Effect of growth regulators on growth and yield parameters of chilli (*Capsicum annuum* L.) cv. K-2"

Materials and Methods:

The present study was undertaken at the Vegetable Unit, Department of Horticulture, Faculty of Agriculture, Annamalai University during 2007.The objective of present study was to study the effect of foliar application of plant growth regulator viz., NAA and brassino steroid on growth characters, physiological characters, yield and quality of chilli cv.K-2. The experiment was laid out in Randomized Block Design with 3 replications and 9 treatments. The transplanting of chilli crop was done at spacing of 45 cm between rows and 60 cm between plants, respectively. During the crop growth, required package of practices were given as per the recommendation to each experimental plots. Intercultural operations were followed timely. The growth regulators i.e. NAA and brassino steroid with concentration of 20 ppm, 30ppm,40 ppm and 50 ppm and brassino steroid with concentration of 0.5, 1.0, 2.0 and 3.0 ppm each were applied as foliar spray at flower bud initiation after transplanting in chilli.. The observations were taken from five randomly selected plants, from each treatment. The results obtained during the present study are summarized here under.

Results and Discussion:

Plant height is an important morphological parameter. Significantly more plant height was recorded in the treatment T_7- brassino steroid 1 ppm (122.38cm) Ingle *et al.* (1993) reported that the greatest plant height was observed at brassino steroid 1 ppm spraying at vegetative, flowering and harvest stages during the cropping period. Based on the results, it can be concluded that brassino steroid 1 ppm had increase plant height significantly. The increase in plant height might be due to apical dominance effects of auxins. The growth regulators are involved in enhancing photosynthetic activity, efficient assimilation, of photosynthetic product and it resulted in rapid cell division and cell elongation brassino steroid in growing point of the plant or stimulation of growth besides increasing uptake of nutrients (Akthar *et al.*1996).

Similar beneficial effect of growth regulators on plant height were reported in chilli by Revnappa (1998). It was observed that the treatment T_7- brassino steroid 1 ppm (22.43 days) has maximum number of branches per plant followed by T_5-NAA 50 ppm over control. This may be due to the increase in the number of primary branches due to auxins attributed to the activation of cell division and cell elongation brassino steroidtion in the axillary buds which had promoting effect in increased number of primary branches and secondary branches. Interaction with synthesis of native cytokinin present in the root cells and its transport at later stages to auxiliary buds, leads to the formation of more branches. Similar effect of growth regulators on number of branches per plant were reported in chilli by Alvarez *et al*.(2005)

In present study fruit setting percentage showed significant difference among all treatments. Showed that treatment T_7- brassino steroid 1 ppm (79.58 %) was found significantly highest followed by treatment T_5-NAA 50ppm (77.48 %). The growth regulators like NAA and brassino steroid are known to involve in inhibition of cellulose and pectinase activities and abscissin production which might have reduced the premature flower drop apart from involved in ovary development during seed filling process in chilli Similar beneficial effect of growth regulators on fruit setting percentage were reported in chilli by Singh and Mukherjee . 2000

Average fruit weight was recorded by treatment T_7- brassino steroid 1 ppm (310.3 g). The average fruit weight is controlled by fruit length, fruit girth and number of seeds per fruit which all were higher in magnitude at T_5- NAA 50 ppm. Similar findings were noticed by Revanappa *et al*. (1998) reported that average fruit weight was highest in brassino steroid 1 ppm foliar spray followed by lower concentration of NAA i.e. 10 ppm. Number of fruit per plant is important yield contributing parameter. The maximum number of fruit per plant was recorded by treatment T_7 - brassino steroid 1 ppm (2327.7 kg ha^{-1}) followed by T_5-NAA 50 and minimum number of fruit per plant was recorded in control (200.10 kg ha_{-1}). Yield per hectare was recorded. It might be due to photosynthetic activity as number of branches, number of leaves and leaf area was more. Similar findings recorded by He-Rey1991

Anju Thakur *et al,* 2002 reported that in chilli the highest number of fruits per plant were noticed with 20 ppm NAA was sprayed twice at flower initiation and 50 per cent flowering compared to control (92.54).

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Table 1: Effect of Plant Growth Regulators on growth and yield Chiili (Capsicum annuum L) cv K-2

Treatment details	Plant height (cm)	Number of branches $plant^{-1}$	Chlorophyll content (mg m^{-1})	Photo-synthetic rate
T_1- Control	97.72	15.19	6.85	77.23
T_2-NAA 20 ppm	99.34	16.31	7.21	82.00
T_3-NAA 30 ppm	112.23	20.46	7.87	88.65
T_4- NAA 40 ppm	109.31	19.57	7.73	87.06
T_5-NAA 50 ppm	116.28	21.78	8.13	91.89
T_6-Brassinosteroid 0.5 ppm	101.35	18.11	7.49	83.67
T_7- Brassinosteroid 1 ppm	118.19	22.43	8.24	93.46
T_8- Brassinosteroid 2 ppm	114.31	21.11	8.00	90.26
T_9- Brassinosteroid 4 ppm	106.26	18.86	7.62	85.44
S.ED	0.95	0.29	0.05	0.77
CD	1.91	0.59	0.09	1.54

Dry matter production kg ha^{-1}	Number of flowers $plant^{-1}$	Number of fruits $plant^{-1}$	Fruit set per cent	Yield $plant^{-1}$	Yield ha^{-1}
2134.62	98.76	51.33	48.04	200.18	1501.40
2567.42	106.04	65.43	53.62	236.44	1773.30

2612.15	117.00	75.16	60.27	285.10	2138.25
2601.35	115.21	73.04	58.66	276.59	2074.42
2637.84	120.59	77.48	63.38	302.17	2319.40
2578.50	110.72	67.61	55.47	259.30	1944.75
2646.51	122.38	79.58	65.02	310.36	2327.71
2621.17	118.76	77.24	61.82	294.00	2205.00
2592.19	113.44	69.84	57.08	267.32	2004.90
4.33	0.22	1.02	0.73	3.92	-
8.67	1.54	2.04	1.47	7.84	-