

Study of pre-flowering foliar spray of plant growth regulator on quality parameters in sweet pepper (*Capsicum annuum* L.) cv. Pusa Deepti under protected condition

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Received : 12.11.2016; Revised : 14.12.2016 ; Accepted : 22.12.2016

ABSTRACT

The present investigation was carried out during the year 2013-2014 at Hi-tech horticulture unit of Department of Horticulture, College of Agriculture, RVSKVV, M.P. The experiment comprised of nine treatments viz. GA₃ (10 and 50 ppm), NAA (10 and 50 ppm), CCC (5 and 10 ppm) and Triacantanol (5 and 10 ppm) and treatments were laid in Completely Randomized Block Design with three replications. Triacantanol treatment has produced maximum ascorbic acid content of fruit (61.39 mg per 100g), whereas high capsaicin content of fruit (0.98%w per w) was found in application of GA₃ @ 50 ppm compared to the control.

Keywords: Ascorbic acid, capsaicin, capsicum, plant growth regulators

The genus *Capsicum* belongs to the family Solanaceae which is grown in several parts of the world and is believed to be native of Tropical South America. The domesticated peppers could be broadly classified into sweet and hot types based on their level of pungency. The bell pepper (*Capsicum annuum* L. var. *grossum* Sendt; 2n = 24) is commonly known as sweet pepper, capsicum or green pepper. They differ from common hot peppers in size and shape of the fruits, capsaicin content and usage. Bell pepper is one of the highly remunerative vegetables cultivated in most parts of the world especially in temperate regions of Central and South America and European countries, tropical and subtropical regions of Asian continent. Plant growth regulators (PGRs) are organic compounds, other than nutrients that modify plant physiological processes. They normally are active in low concentrations in plants. Among the plant bio-regulators, the effect of auxins, gibberellins has already been proved. Retardants like CCC are known to control excessive biomass production and they produce their effects through changing the internal levels of the naturally occurring hormones, thereby, causing a modification of growth and development in the desired direction and to the desired extent. Triacantanol has been recently proved to improve the yield without morphological alteration. The present investigation was aimed to find out the suitable plant growth regulators for increasing quality in sweet pepper.

MATERIALS AND METHODS

The present experiment was carried out at the Hi-tech Horticulture unit of the Department of Horticulture, College of Agriculture Indore (M.P.) during 2013-

14. The experiment comprised of nine treatments viz. GA₃ (10 and 50 ppm), NAA (10 and 50 ppm), CCC (5 and 10 ppm) and Triacantanol (5 and 10 ppm) and laid in Completely Randomized Block Design with three replications. The parameters like fruit colour, fruit shape, fruit size (small size- <52 cc, medium- 52-56cc and large- >56cc), ascorbic acid content (mg 100g⁻¹) and capsaicin content (% w per w) were observed. Observations were recorded on the basis of five random competitive plants selected from each plot separately for quality parameters which were evaluated as per standard procedure. The ascorbic acid content fruits was determined by using 2, 6 dichlorophenol indophenols titration method (AOAC, 1975) and was expressed in mg per 100 g of the fresh fruit weight. The capsaicinoids content of the extract was estimated by spectrophotometric method (Sadasivam and Manikam, 1992).

RESULTS AND DISCUSSION

Experimental results revealed that (Table 1) Pusa Deepti fruits are smooth, erect, conical, light green with thick flesh, 9-11 cm long and 3-5 cm in diameter. Treatment T₂ and T₄ at different concentration i.e. 10 ppm, 50 ppm, shows a little variation from original colour and shape to that of varietal fruit characters at initial fruiting period. A little variation observed by application of NAA at 10 and 50 ppm concentration, which may be due its effect on fruit formation through cell division and elongation. Some deformity in fruit shape was observed in NAA treatment. Similarly fruit color varies in same treatment (yellowish green) because NAA had a generally inhibitory effect on chlorophyll and carotenoid contents (Czerpak *et al.*, 2001).

The maximum ascorbic acid (61.39 mg 100g⁻¹) was observed with the application of Triacontanol (10ppm), which was followed by NAA @ 50 ppm (58.32 mg 100 g⁻¹). Triacontanol produced highest amount of ascorbic acid content which may due to its effect on metalabolic activity. Similarly, NAA also significantly increased ascorbic acid content. The finding is supported by Miniraj and Shanmugavelu (1987) who observed increase in ascorbic acid content (49.56 mg 100g⁻¹) as compared to control (29.64 mg 100g⁻¹) in chilli fruits by application of triacontanol at 2 ppm concentration. Pandita *et al.* (1976) recorded maximum acidity in tomato fruits by spraying 50 ppm NAA. The treatment also increased ascorbic acid content of fruits. Mehrotra *et al.* (1970) observed that NAA application in tomato plants resulted in maximum ascorbic acid content in fruits. Highest capsaicin content

(0.98% wperw) was observed when plants treated with GA₃ (10 and 50 ppm) followed by T1 (0.93% wperw). As this area of research is still under development stage so, the research work done in this field of growth regulators effect on capsaicin content of sweet pepper fruit is scanty. However, it was reported that sweet pepper fruits contain on an average 0.7-1.4% wperw capsaicin (Abdullah *et al.*, 2011)

On the basis of present finding it can be concluded that foliar application of Triacontanol (10 ppm) significantly showed effect on ascorbic acid content of fruit (61.39 mg 100g⁻¹) followed by NAA @ 50 ppm (58.32 mg 100 g⁻¹). The application of GA₃ (50ppm) shown maximum capsaicin content in fruit (0.98% w per w), which was followed by GA3 @ 10ppm (0.98% w per w).

Table 1: Effect of plant growth regulators on fruit characters and quality parameters of capsicum

Treatment	Fruit colour	Fruit shape	Fruit size* acid (mg100g ⁻¹)	Ascorbic content (%w per w)	Capsaicin
GA3 10 ppm	Light green	Smooth,erect, conical	Medium	55.67	0.93
GA3 50 ppm	Light green	Smooth,erect, conical	Big	55.24	0.98
NAA 10 ppm	Yellowish green	Smooth, slightly curved, conical	Medium	58.11	0.81
NAA 50 ppm	yellowish green	Smooth, slightly curved, conical	Small	58.32	0.83
CCC 5 ppm	Light green	Smooth,erect, conical	Big	55.79	0.81
CCC 10 ppm	Light green	Smooth,erect, conical	Big	55.19	0.86
Triacontanol 5 ppm	Light green	Smooth,erect, conical	Big	57.99	0.91
Triacontanol 10 ppm	Light green	Smooth,erect, conical	Big	61.39	0.86
Control	Light green	Smooth,erect, conical	Big	54.33	0.92
SEm (±)				0.71	0.71
LSD 0.05)				1.52	1.52

Note: T₁ – GA₃ 10 ppm, T₂ – GA₃ 50 ppm, T₃ – NAA 10 ppm, T₄ – NAA 50 ppm, T₅ – CCC 5 ppm, T₆ – CCC 10 ppm, T₇ – Triacontanol 5 ppm, T₈ – Triacontanol 10 ppm, T₉ – Control

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