

Response of growth regulators on bulb yield of onion (*Allium cepa* L.)

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ABSTRACT

Three growth regulators namely – IAA, NAA and GA with five concentration i.e. 0, 20, 30, 40 and 50 ppm were tested on bulb yield and its determining characters in onion. GA was found most effective growth regulator whereas 40 ppm concentration was found optimum for enhancing the bulb yield, bulb weight and vertical diameter in onion. Hence, GA at 40 ppm concentration can be recommended for increasing the bulb yield in onion.

Key words : IAA, NAA, GA, Onion.

INTRODUCTION

Onion (*Allium cepa* L.) is one of the important species of the world which is cultivated in more than 100 countries. India produces about 4.58 million tones from an area of 0.39 million hectares. Madhya Pradesh is also an important producer and exporter but productivity of the crop in the state is far below the expectation. In the recent years, the use of growth regulators in improvement of quality and yield of vegetable and spices has been emphasized. However, the optimum doses of growth regulators have not been adequately determined in onion. In the present study an attempt was therefore, made to identify the growth regulators and their concentration for obtaining the maximum yield of onion.

MATERIALS AND METHODS

Fifteen treatments three growth regulators (NAA, IAA and GA) and their five concentration (0, 20, 30, 40 & 50 ppm) were tested in randomized complete block design with three replication on yield of onion. Six-week-old seedlings of onion were dipped with different concentration of growth regulators as per treatment 24 hours before transplanting. The recommended doses of fertilizers and plant protection measures were adopted for optimum crop growth. Observations were recorded on plant height (cm), plant spread (cm), plant diameter (cm), leaves per plant, days to maturity, bulb weight per plant (g), bulb yield (q/ha), dry bulb weight (g/100) and vertical bulb diameter (cm.). The data were analysed by adopting the standard procedures.

RESULTS AND DISCUSSION

The bulb yield and its determining characters were significantly influenced by the application of different concentrations of growth regulators except plant height, leaves per plant and days to maturity (Table 1). The maximum bulb yield of 339.22 q/ha was recorded due to application of GA, which was significantly superior to IAA and NAA. The increase in yield due to application of GA was 9.04 and 7.67 percent higher than IAA and NAA. The lowest yield of 311.09 q/ha was recorded due to application of IAA. The increase in yield due to application of GA was mainly associated with increase in bulb diameter, dry bulb weight, bulb weight per plant and plant spread as also reported by Singh *et al.* (1983) and Maurya and Lal (1987).

The variation in yield was in between 272.48 to 344.47 q/ha due to different concentration of growth regulators. The maximum yield was recorded due to application of 40ppm of growth regulators but it was not found significantly superior to 20 and 30 ppm concentrations. The lowest yield was observed in control (0ppm), which was significantly inferior to rest of the concentrations. Higher concentration of growth regulator adversely affects the bulb yield in onion. The increase in bulb yield was mainly attributed due to increase in bulb weight per plant, dry bulb weight and vertical bulb diameter. Singh *et al.*, (1995) have reported that application of growth regulators increase the accumulation of food materials and bulb yield in onion. It can be concluded the GA was found most effective in enhancing the bulb

Table 1 : Response of growth regulators and their concentrations on bulb yield and its determining characters in onion.

Growth regulators	Plant height (cm)	Plant spread (cm)	Plant diameter (cm)	Leaves per plant	Days to maturity	Bulb weight per plant (g)	Bulb yield q/ha	Dry bulb weight (g/1000)	Vertical bulb diameter
Plant growth regulators									
NAA	53.60	13.71	1.11	5.73	145.33	83.90	315.07	10.06	4.84
IAA	52.17	13.57	1.18	5.68	147.06	81.06	311.09	9.86	4.85
GA	55.85	13.89	1.20	5.58	145.59	88.86	339.22	10.33	5.04
SEm+	1.54	0.09	0.01	0.08	0.59	0.59	2.01	0.03	0.05
CD 5%	NS	NS	0.04	NS	NS	1.70	5.83	0.10	0.15
Concentration of growth regulators									
0 ppm	51.68	13.18	1.08	5.46	148.00	63.12	272.48	9.44	4.70
20 ppm	55.13	13.9	1.18	5.73	145.66	91.21	334.65	10.24	4.94
30 ppm	54.31	13.98	1.21	5.68	145.21	93.50	339.60	10.32	5.05
40 ppm	55.26	13.90	1.21	5.86	144.77	94.33	344.47	10.39	5.09
50 ppm	52.97	13.57	1.13	5.57	146.33	80.88	317.77	10.01	4.78
SEm +	1.99	0.12	0.02	0.11	0.76	0.76	2.59	0.04	0.07
CD 5%	NS	0.33	0.05	NS	NS	2.19	7.52	0.12	0.20

yield. Similarly, 40 ppm concentration of growth regulators was optimum for better yield in onion. However, present studies suggest the vigours testing of different concentration of growth regulators in different varieties of onion to determine the optimum dose.

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