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Short communication

Influence of biofertilizes and NAA on growth and yield of Chilli (*Capsicum annuum* L.) CV. JM-283

Moresh Kumar Athaneria, Nisha Sengar and BR Pandey

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India is the largest producer of chillies in the World. The indiscriminate use of inorganic fertilizer leads to nutrient imbalance in soil causing ill effect on soil health. Therefore, there is need to supplement the inorganic fertilizers along with organic and biofertilizer to maximum possible level. Biofertilizers are an important component of organic farming they are less expensive, eco-friendly and sustainable, do not require non-renewable source of energy during their production and improve crop growth and quality of crops. They increase sustainability of the soil and make it more productive. The production of chilli is reduced due to flower and fruit drop, which is caused by physiological and hormonal imbalance in the plants particularly under unfavorable environments, such as extremes of temperature i.e. too low or high temperature (Erickson and Makhart, 2001). Studies on the effect of plant growth regulators in solanaceous fruit and vegetable crops have revealed that the application of some of the plant growth regulators has been found effective in reducing the flower and fruit drops thereby enhancing production of chilli per unit area and per unit time. The present study was, therefore, conducted with suggested concentrations of NAA as foliar spray to determine the effective concentrations promoting growth and yield in commercial cultivation of chilli.

Field experiment was conducted during 2007-08 at Maharajpur Vegetable Research farm, Department of Horticulture, J.N.K.V.V. Jabalpur with 16 treatment combinations of biofertilizers and NAA .The experiment was laid out in Factorial Randomized Block design with three replication. The seed of chilli was sown in the beds 3x1m in size in the first week of August. Six week old seedlings of uniform height (about 15-17 cm) were selected and transplanted in the field with the spacing of 60 x 45cm. Experiment treatments include B_0G_0 (control), B_0G_1 (Without Biofertilizers + 20 ppm NAA), B_0G_2 (Without Biofertilizers + 40 ppm NAA), B_0G_3 (Without Biofertilizers + 60 ppm NAA), B_1G_0 (Azotobacter + 0 ppm NAA), B_1G_1 (Azotobacter + 20 ppm NAA)B_1G_2 (Azotobacter + 40 ppm NAA), B_1G_3 (Azotobacter + 60 ppm NAA), B_2G_0 (PSB + 0 ppm NAA), B_2G_1 (PSB + 20 ppm NAA), B_2G_2 (PSB + 40 ppm NAA), B_2G_3 (PSB + 60 ppm NAA), B_3G_0 (Azotobacter + PSB+ 0 ppm NAA), B_3G_1 (Azotobacter + PSB+ 20 ppm NAA), B_3G_2 (Azotobacter + PSB+ 40 ppm NAA), B_3G_3 (Azotobacter + PSB+ 60 ppm NAA).Before transplanting seedlings are dipped in the biofertilizers for 30 min.NAA were applied with two sprays in different concentrations. The first spray was done at 35 DAT and second spray at 50 DAT. The observations with regard to the growth and yield components was recorded from the five randomly selected plants .The mean value of the recorded data was considered as the actual value of the respective characters. The first observations were recorded at 30 days after transplanting and there after observations were recorded at a regular interval of 30 days up to 90 days

Moresh Kumar Athaneria, Nisha Sengar and BR Pandey
Department of Horticulture
Jawaharlal Nehru Krishi Vishwa Vidyalaya,
Jabalpur-482004, India
E-mail: nishu.sengar@gmail.com

Table 1: Influence of biofertilizers and NAA on the growth parameters of Chilli.

Treatment	Plant Height(cm)			No. of Branches/plant		
	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
B_0G_0	20.80	29.86	38.20	6.06	6.80	9.40
B_0G_1	23.20	36.13	43.53	6.20	8.66	11.53
B_0G_2	26.66	39.46	48.20	7.20	10.33	12.26
B_0G_3	24.06	37.86	45.53	6.93	9.20	11.86
B_1G_0	29.60	46.60	55.00	6.86	10.20	12.60
B_1G_1	31.80	47.06	57.60	7.20	11.46	13.00
B_1G_2	34.00	51.86	63.00	8.40	12.33	14.26
B_1G_3	33.00	47.80	59.40	7.60	11.73	13.53
B_2G_0	22.53	38.73	44.33	6.26	7.86	11.46
B_2G_1	24.06	41.20	47.53	6.80	8.20	12.00
B_2G_2	29.93	46.26	53.06	7.60	10.13	12.93
B_2G_3	27.33	43.40	50.40	7.13	9.73	12.33
B_3G_0	26.26	40.20	51.86	6.46	9.33	11.73
B_3G_1	28.53	44.40	52.53	7.06	9.86	12.26
B_3G_2	33.55	50.20	60.00	7.86	11.89	13.60
B_3G_3	31.20	46.20	57.20	7.60	10.66	13.00
SEm±	NS	0.63	NS	NS	0.14	0.11
CD at 5 %	NS	1.83	NS	NS	0.41	0.32

after transplanting. The mean data of the all five selected plants analyzed statistically.

The Experiment data revealed that the growth parameters viz. plant height and number of branches per plant at different stages of growth and development influenced by the biofertilizers and various concentration of NAA (Table 1).Maximum plant height (34.00,51.86,63.00 cm) and number of braches/plant (8.40,12.33,14.26) at 30,60,90 (DAT) respectively were noted with the B_1G_2 and minimum recorded under the treatment B_0G_0 .The increase in these parameters might be due to the azotobactor it fixes the atmospheric nitrogen hence it increased the availability of Nitrogen in the soil and secret growth promoting substances, which accelerates the physiological process like synthesis of carbohydrate. Similar findings were reported by Basavaraju *et al.* (2002) in Brinjal, and Sajan *et al.* (2002) in chilli

NAA improves the internal physiology of plant in terms of better supply of water, nutrient and other biocompounds vital for their proper growth and development .Similar result were also obtained by Meena and Dhaka(2003) in brinjal and Khurana *et al* (2004) in chilli

Data presented in Table 2 clearly indicate that the yield and yield attributing characters differed significantly as affected by different concentration of NAA in combination with biofertilizers. Maximum Length of fruit (9.65 cm), Girth of fruit (3.14 cm), No. of fruits/ plant (68.53), No. of fruits/plot (2308.80) and Yield/ plant (81.47gm), Yield/plot (2.93kg), Yield/ha. (30.13q) was recorded under the treatment combinations B_3G_2. Highest fresh wt. (25.36gm.),dry wt.(8.01gm) of ten ripe fruits ,seed yield/plant (10.55gm), and 1000 seed weight (6.03gm) was noted in B_3G_2 which was significantly superior over other treatment combination. This increase might be because Azotobacter + PSB increased availability of N and P in the soil by fixing more atmospheric nitrogen by Azotobacter and increased solubilization of unavailable phosphates in the soil by PSB by facilitation their extraction and transportation towards plant system. It might also be possible that dual inoculation might have interaction effects on more metabolic levels. These results are in agreement with that reported by Nawalkar *et al.* (2007) and Purvey and Sen (2007). Better performance of NAA might be due to appropriate growth of plants, control of abscission layer in full bloom stage and acceleration in fruit development by the positive hormonal actions. These results are supported by the findings of Khuarana *et al.* (2004) and Choudhary *et al.* (2006).

Table 2: Influence of biofertilizers and NAA on the Yield parameters and Yield of Chilli

Treatment	Length of fruits (cm)	Girth of Fruits (cm)	No. of fruits/ plant	No. of fruits/plot	Yield/ plant (gm)	Yield/ plot (Kg)	Yield/ha (q)	Fresh fruit wt. (gm)	Dry wt.(gm)	Seed yield/plant (g)	1000 seed wt.(gm)
B_0G_0	6.78	2.56	33.33	1200.0	49.20	1.43	18.17	16.73	5.08	6.12	3.11
B_0G_1	7.04	2.68	37.46	1351.2	51.46	1.85	19.06	17.33	5.34	6.51	3.37
B_0G_2	8.30	2.80	41.66	1500.0	58.40	2.31	21.60	18.20	5.51	7.25	3.65
B_0G_3	7.70	2.72	39.73	1430.4	55.80	2.00	20.63	17.66	5.45	7.19	3.47
B_1G_0	8.80	2.79	52.53	1891.2	64.66	2.32	23.90	20.46	6.44	7.72	3.45
B_1G_1	8.38	2.83	54.00	1944.0	67.20	2.41	24.85	20.96	6.57	8.04	4.58
B_1G_2	8.83	3.11	58.46	2104.8	72.60	2.61	26.86	21.46	7.06	8.83	5.05
B_1G_3	8.70	2.90	56.26	2025.6	69.26	2.49	25.61	19.80	6.67	8.56	4.73
B_2G_0	7.34	2.68	43.20	1555.2	56.26	2.02	20.82	21.70	5.61	7.27	3.63
B_2G_1	7.39	2.79	45.13	1624.8	58.66	2.10	21.69	21.70	5.78	7.53	3.78
B_2G_2	8.35	2.90	50.73	1826.4	65.46	2.35	24.22	20.46	6.44	8.50	4.47
B_2G_3	8.02	2.85	48.40	1742.4	61.20	2.19	22.61	22.93	6.08	7.97	4.14
B_3G_0	8.71	3.25	60.13	2164.8	73.53	2.64	27.05	23.60	7.13	9.37	5.18
B_3G_1	9.08	3.32	62.20	2239.2	75.06	2.70	27.77	25.36	7.36	9.60	5.33
B_3G_2	9.65	3.41	68.53	2467.2	81.46	2.93	30.13	34.10	8.01	10.55	6.03
B_3G_3	9.37	3.36	65.66	2364.0	77.33	2.77	28.56	24.00	7.57	9.95	5.66
SEm±	0.083	0.25	0.356	12.85	018	0.0068	0.051	0.045	0.315	0.065	0.007
CD at 5 %	0.240	0.74	1.02	37.11	0.54	0.0199	0.150	0.130	0.090	0.18	0.021

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