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Short communication

Response of cucumber (*Cucumis sativus* L.) to chemical fertilizers and bio-fertilizer

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The cucumber (*Cucumis sativus* L.) is essentially a warm season crop mainly grown in the tropical and subtropical regions The cucumber is grown for its tender fruits for salad purpose and for pickling. Fruits have cooling effect and are used by patients suffering from jaundice, constipation and indigation. Keeping all these facts in view the investigation pertaining to the Response of cucumber (*Cucumis sativus* L.) Cv. Gujarat Cucumber-1 to chemical fertilizers and bio-fertilizer on growth, yield and quality.

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The experiment was conducted at the Navsari Agricultural University, Navsari during March, 2007. The experiment was laid out in a Randomized Block Design (RBD) with four replications adopting 2 x 2 m spacing with total area 1442 m^2. The fertilizers were applied at the rate of 50: 25: 25 NPK Kg/ha and FYM @10 t/ha. Remaining half quantity of nitrogen was top dressed uniformly at the time of flowering. The given treatments were T_1: Control (Untreated), T_2: 100% RDF (N50:P25:K25 Kg/ha), T_3: 75% RDF + Azospirillum, T_4: 0%RDF + Azospirillum, T_5: 75% RDF + PSB, T_6: 50% RDF + PSB, T_7: 75% RDF + Azosprillum + PSB and T_8: 50% RDF+ Azospirillum + PSB, Azospirillum and PSB@ 2 kg/ ha.

Results revealed that application of 75% RDF + Azospirillum + PSB (T_7) recorded the maximum vine length (330.75 cm),(Table 1). This might be affected the combined application of organic manures, inorganic fertilizers and bio-fertilizers increased the absorption of nutrients especially nitrogen which enhanced the cell division, cell elongation and increased the plant growth. Bio-fertilizers also produced the growth promoting substances viz., auxin, gibbrellins and cytokinin which contributes towards vigorous growth of the plant in cucumber Nirmala and Vadivel (1999), and in Brinjal Wange and Kale (2004).

Appearance of the first female flower (28.00 days) was observed with treatment of 75 % RDF + Azospirillum + PSB (T_7) as given in Table 1. It was statistically at par with treatments T_3 and T_5 (28.50 and 29.75 respectively). It might be due the combined application of phosphobacteria and Azospirillum,. Similar finding have been reported in cucumber by (Nirmala *et al.* 1999) Number of male flowers and female flowers per vine and male: female sex ratio differed significantly with application of chemical fertilizers and bio-fertilizers. The treatment T_7 (75% RDF + Azospirillum + PSB) noted

Table 1: Effect of chemical fertilizers and bio-fertilizers on the flowering parameters of cucumber cv. Gujarat cucumber-1

Treatments	Vine length (cm)	Appearance of the first female flower (days)	Male flowers/ vine	Female flowers/ vine	Male: female sex ratio
T_1	274.00	35.50	70.00	11.15	8.18
T_2	292.75	33.50	80.75	16.25	7.44
T_3	324.75	28.50	90.65	19.70	6.33
T_4	285.50	33.75	73.80	13.45	7.49
T_5	317.25	29.75	89.60	19.25	6.60
T_6	286.75	34.75	74.90	13.85	7.71
T_7	330.75	28.00	92.75	19.75	6.00
T_8	296.25	32.00	83.05	17.15	7.10
S.Em ±	1.37	0.97	3.28	0.86	0.26
C.D. at 5%	4.01	2.84	9.63	2.54	0.77

maximum number of male flowers and female flowers per vine (92.75 and 19.75 ,respectively) and lowering sex ratio as compared to control (6.00) as depleted in Table 1. It might be due to the Azospirillum inoculation would have induced changes in fluidity of cell membranes due to Auxin and enzymes which present the loss of nutrients and metabolic products from the plants. These nutrients and metabolic products would have been either re-absorbed or metabolized, leading to the utilization of the energy. Application of phosphobacteria provides protection against the non-parasitic to pathogens produces biologically active substances like Auxin and gibbrellins and transform unavailable mineral and organic compounds in to forms available to plant. These results are in conformity with finding of Nirmala *et al.* (1999).

Significantly higher value of fruit length (33.75 cm) and girth (12.53 cm) was noted with treatment T_7 (75% RDF + Azospirillum + PSB) it was statistically at par with treatments T_3 and T_5 and T_3, T_4, T_5 and T_8, respectively (Table 2). The combined application of Azospirillum, phosphobacteria and Vasicular Arbicular Micorizha (VAM) as soil application was found to have higher fruit length and fruit girth, it might be due to the Dihydrozeatin which had a positive influence on the physiological activity of the plants there by increase yield (Nirmala *et al.* 1999).in the treatment T_7 (75% RDF + Azospirillum + PSB) had maximum fruit yield per plot (18.87 Kg/plot) and per hectare (23590.31 Kg/ha) and it was statistically at par with treatments T_3 and T_5 (Table 2). This may be due to the application of Azospirillum and PSB was effective in nitrogen fixation, synthesis of plant growth promoting hormones and enzyme activation. Nirmala *et al.* 1999 in cucumber. Adam *et al.* (2003) in cantaloupe, Wange and Kale (2004) and Anburani *et al.* (2003) Brinjal and Wange and kale (2003) in Okra.

Table 2: Effect of chemical fertilizers and bio-fertilizers on the performance of yield and quality characters of cucumber cv. Gujarat cucumber-1

Treatments	Fruit length (cm)	Fruit girth (cm)	Fruit yield		TSS %
			Kg/plot	Kg/ ha.	
T_1	21.99	7.99	10.51	13144.06	2.07
T_2	28.63	9.96	15.86	19831.56	2.42
T_3	32.80	12.37	18.19	22740.93	2.99
T_4	28.30	10.69	14.22	17777.19	2.20
T_5	32.06	12.05	18.00	22500.00	2.97
T_6	28.14	9.87	13.49	16874.38	2.18
T_7	33.75	12.53	18.87	23590.31	3.11
T_8	29.01	11.00	16.22	20275.00	2.53
S.Em ±	1.37	0.63	0.87	1081.39	0.10
C.D. at 5%	4.01	1.86	2.54	3179.90	0.30

Total soluble solids brix (3.11%) was found significantly highest in treatment T_7 (75% RDF + Azospirillum + PSB), which was statistically at par with treatments T_3 and T_5 (Table 2). The increased in quality due to application of bio-fertilizers and nitrogen, phosphorous and potassium could be attributed to the metabolic activities, which synthesis of higher amount of acids have contributed to synthesis of TSS%, acidity and ascorbic acid in Tomato (Kumaran and Natrajan, 2001). The results are in conformity with Adam *et al.* (2002) in cantaloupe.

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