

EFFECT OF BIOFERTILIZERS (BLUE GREEN ALGAE) ON YIELD OF CHILLI (*Capsicum annum L.*) CROP

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ABSTRACT

The pot culture experiments on chilli was conducted during kharif 2015, Sangamner tehsil dist Ahmednagar to observe the influence of blue green algae as biofertilizer on the growth and yield of chilli. The Sangamner tahsil is located in northern part of the Ahmednagar district of Maharashtra state. The tahsil lies between 18036'to 1901'N latitude and 7401'W to 74056'W longitude. The area drained by Pravara River. The present paper includes that during last few decades in above locality, due to extensive use of chemical fertilizers the productivity & fertility of soil is reduce. To overcome this problem it was decided to study the roll of BGA bioferitilizers in Chilli crops .the role of BGA biofertilizers was studied with observation in BGA alone, BGA +FYM and chemical fertilizers treatment as compared to control. Use of BGA +FYM biofertilizer to Chilli crop in field is beneficial for fruit yield than BGA alone or chemical fertilizers.

Keywords: Blue green algal, biofertilizer and Chilli crop, soil fertility

INTRODUCTION

In India the studies on BGA biofertilizer have been initiated in national centre for conservation and utilization of blue green algae (NCCUBGA) at Indian agricultural research institute (IAR I) New Delhi .In India the pioneer work in this field, was done by DE (1939), Singh (1691), Venkatraman (1961) ,Venkatraman and Goel (1987).

The economics and environment consult for high use of chemical fertilizers, sustainability also requires that ecologically sound and alternative must be sought because of biological nitrogen fixation 65% of nitrogen currently utilized in agriculture, it increase the productivity of crop specially for sustainable system .The legume – Rhizobium symbiosis has done effective roll to maintain the status of nitrogen of soil. The contribution of blue green algae (BGA) is a good source for long term fertility of soil.

For present investigation, Sangamner tahsil have been selected as experiment study region. The area drained by Pravara river, which originate in the hilly region of Western Ghats, Ratangarh. The soil of the area are mainly derived from the Deccan basalts. The soil along the bank of the Pravara river are deep alluvial soils .These soils generally black in colour ,fine texture, highly fertile and good water holding capacity .

In general the climate is dry and hot. The average maximum temperature during summer is high as 42⁰C in month May and average minimum temperature fall up to 10⁰C during the month of December. The area receives rainfall chiefly from the south waste monsoon between June and September as the area falls under the rain shadow very low perception, annual rainfall ranging from 290 to 594mm.

MATERIALS AND METHODS

The pot culture experiments on chilli was conducted during kharif 2015 to observe the influence of blue green algae as biofertilizer on the growth and yield of chilli.

The pots used for pot culture experiment were of bottom diameter 17 cm and top diameter 21 cm. The height of pots was 20 cm with small hole at bottom.

The pots were filled with 5 kg sieved soil. The small quartz sand stone was placed at bottom before filling the pots with soil. The pots were irrigated with irrigation water and allowed to evaporate till the moisture content at field capacity. The certified seeds of chilli were sown on raised beds for raising seedling. The moisture content of pot soil was maintained at field capacity gravimetrically throughout the experimental period. Two seedlings each of chilli were transplanted in each pot for experimental studied at field capacity and immediately irrigated with approximately 150-200 ml of irrigation water. Three identical sets of pot culture experiment were arranged for studying the effect of source of irrigation water viz normal water, saline water and agrobased industrial effluent respectively. The pot culture experiment was conducted in green net house.

Treatment details for chilli:

The quantity of biofertilizer and fertilizers applied to chilli crop

Sr. No	Treatment	Symbol	Quantity of fertilizers applied (g/pot)
1	Control	A	-
2	BGA	B	5
3	BGA+FYM	C	5+250
4	Chemical fertilizer	D	2.5 (19:19:19)

The remaining quantity of nutrients as per recommended dose were applied through urea, single superphosphate muriate of potash.

This BGA mixture consists of dried mass of Nostoc, Ananaena, and Oscillateria were used to know effects of BGA on chilli.

RESULT AND DISCUSSION

Effect of irrigation water and fertilizer treatments:

The related to height of plants, number of leaves, flowers, fruits, weight of fruits as influenced by water and fertilizers are presented in table 1,2 and 3.

Fruit and Fruit yield of chilli:

Number of fruits: The combined use of BGA+FYM, chemical fertilizer and BGA were significant for number of chilli fruits at flowering stage (6.11, 5.85 and 4.37 respectively). The sources of irrigation water and interaction effects of irrigation water and fertilizers were non significant.

Table 1: Effect of irrigation water, fertilizer and their interactions on number of fruit of chilli (pl-1) at flowing stage

Fertilizer Irrigation	Control	BGA	BGA+FYM	Chemical fertilizer	Mean
Normal water	3.11	4.55	5.22	4.78	4.42
Saline water	0.44	5.11	7.78	7.89	5.30
Agrobased industrial effluent	3.33	3.44	5.33	4.89	4.25
Mean	2.30	4.37	6.11	5.85	

	SE ±	CD (5%)
Irrigation	0.692	N.S
Fertilizer	0.799	2.344
Irrigation X Fertilizer	1.385	N.S

Fruit yield of chilli:

The number of fruits and fruit yield as affected by irrigation water, fertilizer treatment and their interactions are presented in Table 2 and 3

The application of BGA+FYM produced significantly higher fruit yield (3.87 g pl-1). The sources of irrigation water and interactions between sources of irrigation water and fertilizer treatments were non significant for fruit yield.

Table 2: Effect of irrigation water, fertilizer and their interactions on harvested fruit (pl-1) of chilli

Fertilizer Irrigation	Control	BGA	BGA+FYM	Chemical fertilizer	Mean
Normal water	2.11	2.83	3.33	3.50	2.94
Saline water	0.50	3.17	2.89	3.56	2.53
Agrobased industrial effluent	1.33	1.44	3.33	2.94	2.26
Mean	1.31	2.48	3.87	3.33	

	SE±	CD (5%)
Irrigation	0.321	N.S.
Fertilizer	0.371	1.088
Irrigation X Fertilizer	0.643	N.S.

Weight of harvested fruits:

The weight of harvested fruits was non significant due to sources of irrigation water, fertilizer treatments and their interactions.

Table 3: Effect of irrigation water, fertilizer and their interactions on weight harvested fruit (gpl-1) of chilli

Fertilizer Irrigation	Control	BGA	BGA+FYM	Chemical fertilizer	Mean
Normal water	3.77	3.09	3.29	3.27	3.36
Saline water	0.59	3.78	5.60	3.53	3.38
Agrobased industrial effluent	1.86	1.59	3.26	3.40	2.53
Mean	2.07	2.82	4.05	3.4	

	SE±	CD (5%)
Irrigation	0.573	N.S.
Fertilizer	0.662	N.S.
Irrigation X Fertilizer	1.146	N.S.

Effect of irrigation water and fertilizer on soil characteristics at harvest:

The chemical properties of soil after harvest of chilli due to use of normal water, saline water, agrobased industrial effluent and application of BGA, BGA + FYM and chemical fertilizer and their interactions are presented in Table 4. The soil pH was slightly alkaline in BGA (8.18), BGA + FYM (8.24) and chemical fertilizer (8.27). The electrical conductivity of soil from similar treatments were low (0.27, 0.26, 0.24 dSm⁻¹ respectively). Calcium carbonate of soil was low due to irrigation water, fertilizers and their interactions. The higher organic carbon content was found in BGA (0.65 %) and BGA + FYM (0.75 %). Whereas, low content of organic carbon was in chemical fertilizer (0.56 %).

The available nitrogen content is in medium class of fertility. However, higher fertility class was observed in respect of potassium and low class in respect of phosphorous.

Table 4: Effect of irrigation water and fertilizer on soil characteristic after harvest of chilli in pot culture experiment

Treatments	pH 1:2.5	EC dSm- l	Exchangeable cation (meq%)			CaCO ₃ %	Organic carbon %	Organic matter %	Available nutrients (kg/ha)		
			Ca ⁺⁺	Mg ⁺⁺	Na ⁺				N	P	K
I) Irrigation											
Normal water	8.17	0.24	40.21	28.23	2.6	10.8	0.49	0.84	273.44	7.69	608.23
Saline water	8.39	0.27	40.81	28.48	1.79	8.40	0.62	1.32	281.13	11.42	558.43
Agrobased industrial effluent	8.19	0.30	44.33	16.89	2.40	8.83	0.61	0.98	310.31	13.26	630.25
II) Fertilizers											
Control	8.29	0.32	41.95	22.68	1.76	9.73	0.53	0.92	240.25	11.0	610.72
BGA	8.18	0.27	41.36	23.78	2.38	7.83	0.65	1.12	253.42	11.31	581.5
BGA+FYM	8.24	0.26	40.92	28.77	2.53	9.0	0.75	0.85	352.08	11.46	641.53
Chemical fertilizer	8.27	0.24	42.9	22.63	2.38	9.97	0.56	1.29	307.42	9.35	562.12
Initial value	8.19	0.26	40.32	26.55	2.35	9.10	0.50	0.86	210.11	7.24	611.6

CONCLUSION

The new technology certainly hold promise and economics are also favorable to exploit biofertilizer products, considering the market potential. The effort of government organization in developing and popularizing this technology coupled with success of demonstration and farmers have adopted this technology. In this experiment the effect of BGA has so far being studied mainly in Chilli pot and it conclude that result .Addition of BGA ,BGA+FYM to chilli crop were beneficial for maintain the soil property with slight change in exchange cation.

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