

Original Research Article

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Studies on Organic Nutrient Management on Growth and Flowering of Cucumber (*Cucumis sativus* L.)

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ABSTRACT

The present investigation entitled, studies on organic nutrient management on growth and flowering of cucumber (*Cucumis sativus* L.) was carried out during summer-2016 at Horticulture Instructional Farm, Department of Horticulture, Chimanbhai Patel College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. Total nine treatments of organic nutrients were tested in the Factorial Randomized Block Design with three replications. Treatments were evaluated on the basis of growth and flowering characteristics of cucumber. Maximum vine length at 30 and 60 DAS, number of branches per plant, leaf area per plant at 45 DAS, number of female flowers per plant and maximum per cent fruit set was recorded with treatment 50% N through castor cake + 50% N through poultry manure + biofertilizers (*Azospirillum*+PSB+ KSM) + *Trichoderma viride* + neem oil.

Keywords

Azospirillum,
Cucumber,
Flowering, Growth,
KSM, PSB and
Trichoderma viride

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Introduction

Cucumber is one of the most popular, quickest maturing and widely grown vegetables originated in India. The immature fruits of cucumber are used as salad and for pickling. Cucumber has great importance due to its short duration and high production

potential as well as high nutritive value. FYM is principle source of organic matter in our country. Neem cake is a potential source of organic manure. Poultry manure contains about 3.30 per cent N, 0.63 per cent P₂O₅ and 1.40 per cent K₂O (Gaur *et al.*, 1982). Castor cake is rich source of N 4.5 per cent, P₂O₅ 1.8 per cent, K₂O 1.0 per cent and micronutrients

(Yawalkar *et al.*, 1996). Use of FYM alone or in combination with organic nutrients helps in proper supply of essential plant nutrients and improve the physico-chemical properties, increases water holding capacity and encourages the soil microbial activities and maintains soil health. Many microorganisms inhabiting soil/rhizosphere play an important role in solubilization of bound form of soil minerals and enhance the availability of nutrients in the soil for plant growth and development. These plant growth-promoting rhizobacteria, including N₂-fixing, phosphate solubilizing bacteria, potassium solubilizing microorganisms are being used as biofertilizers to minimize health hazards caused by the use of chemical fertilizers. In recent years, free living bacteria (*Azotobacter*), associate (*Azospirillum*) and symbiotic (*Rhizobium*) bacteria, phosphate solubilizing (*Bacillus megaterium*, *B. polymyxa* and *P. striata*) and the potassium solubilizing microorganisms (KSMs) are gaining much popularity. Application of biofertilizer encouraged plant growth and productivity of many crops. Utilization of biofertilizers in the form of microbes is very successful in minimizing chemical fertilizer to half of the recommended dose.

Materials and Methods

Four organic manures (FYM, poultry manure, neem cake and castor cake) in various combinations with bio-fertilizers (*Azospirillum*+PSB+KSM) and *Trichoderma viride* were tried. Total nine treatments viz., T₁ (50% N from FYM + 50% N from Poultry Manure), T₂ (50% N from Neem cake + 50% N from Poultry Manure), T₃ (50% N from Castor cake + 50% N from Poultry Manure), T₄ [T₁ + Biofertilizer (*Azospirillum* + PSB + KSM)], T₅ [T₂ + Biofertilizer (*Azospirillum* + PSB + KSM)], T₆ [T₃ + Biofertilizer (*Azospirillum* + PSB + KSM)], T₇ (T₄ + *Trichoderma viride* + Neem oil), T₈ (T₅ +

Trichoderma viride + Neem oil) and T₉ (T₆ + *Trichoderma viride* + Neem oil). All the treatments were applied at the time of field preparation. Observation for growth and flowering were recorded and the mean data were subjected to statistical analysis following analysis of variance technique (Panse and Sukhatme, 1985).

Results and Discussion

Effect of organic nutrients on growth parameters

Data in Table 1 showed significant difference for growth parameters among different levels of organic nutrient.

Significantly maximum vine length (70.87 cm) and (428.06 cm) at 30 and 60 DAS respectively, number of branches per plant (6.01) and leaf area (2187.89 cm²) was recorded with application of 50 per cent N from Castor cake + 50 per cent N from Poultry Manure + Biofertilizer (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + Neem oil (T₉).

The increase in vine length at 30 DAS might be due to improve moisture availability which enhanced nutrients release to plant for increased vine growth. Similar variation in respect to main vine length due to different organic manures were previously reported by Karuppaiah and Kathiravan (2006), Prabhu *et al.*, (2006), Eifediyi *et al.*, (2010) and Eifediyi and Remison (2010) in cucumber.

Increase the vine length at 60 DAS might be due to the application of organic manure along with biofertilizer is necessary to increase the content of organic matter, maintain the nutrients balance for crops and improve the physical and chemical properties of the soil.

Table.1 Effect of organic nutrient on growth and flowering parameters

Organic nutrient	Vine length at 30 DAS (cm)	Vine length at 60 DAS (cm)	Number of branches per plant	Leaf area per plant at 45 DAS (cm ²)	Days taken to flower initiation	Number of male flowers per plant	Number of female flowers per plant	Per cent fruit set
T₁ = 50% N from FYM + 50% N from Poultry Manure	29.94	325.87	3.20	941.34	35.57	68.70	17.67	41.05
T₂ = 50% N from Neem cake + 50% N from Poultry Manure	39.46	338.36	3.20	1212.75	32.28	70.63	18.50	45.27
T₃ = 50% N from Castor cake + 50% N from Poultry Manure	43.52	344.64	3.84	1227.58	32.03	73.67	18.73	46.95
T₄ = T₁+ Biofertilizer (<i>Azospirillum</i> +PSB + KSM)	52.08	355.04	4.44	1312.64	31.02	78.07	19.93	51.17
T₅ = T₂+ Biofertilizer (<i>Azospirillum</i>+PSB+ KSM)	58.04	382.92	1.94	1500.74	30.46	85.00	21.63	54.54
T₆ = T₃+ Biofertilizer (<i>Azospirillum</i>+PSB+ KSM)	57.04	412.05	3.61	1589.70	30.26	93.90	23.53	57.91
T₇ = T₄+ <i>Trichoderma viride</i> + Neem oil	63.67	427.22	5.61	1793.61	29.97	99.70	24.13	62.96
T₈ = T₅ + <i>Trichoderma viride</i> + Neem oil	66.61	424.76	5.96	2187.89	29.87	100.77	24.53	64.65
T₉ = T₆ + <i>Trichoderma viride</i> + Neem oil	70.87	428.06	6.01	1252.84	29.53	101.77	25.43	66.34
S.Em.±	1.61	14.01	0.24	73.13	0.93	2.00	0.59	2.11
C.D. at 5%	4.63	40.28	0.71	210.16	2.68	5.75	1.69	6.06
C. V.%	7.39	8.99	14.38	12.38	7.34	5.71	6.71	9.48

The positive effect of organic manure on growth parameters obtained in this study was supported by Prabhu *et al.*, (2006) Eifediyi *et al.*, (2010) and Eifediyi and Remison (2010) in cucumber.

Significantly maximum number of branches per plant similar results was earlier reported by Karuppaiah and Kathiravan (2006), Eifediyi and Remison (2010) and Anjanappa *et al.*, (2012) in cucumber. Significantly maximum leaf area similar results are in close accordance with the findings of Karuppaiah and Kathiravan (2006) in cucumber.

Effect of organic nutrient management on flowering

Data in Table 1 showed significant difference for flowering parameters among different levels of organic nutrient.

Significantly minimum days taken for initiation of flowering (29.53), maximum number of female flowers per plant (25.43) and per cent fruit set (66.34) were recorded with application of 50% N from castor cake + 50% N from poultry manure + biofertilizers (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + neem oil (T₉), which was statistically at par with treatment T₈, T₇, T₆, T₅, T₄ and T₃. Early flowering under the influences of integrated supply of nutrients through organic manures and biofertilizers might be due to better soil health which improves flowering parameters Anjanappa *et al.*, (2012) in cucumber. The findings are in the accordance with the results of Singh *et al.*, (2012) and Anjanappa *et al.*, (2012) in cucumber.

Significantly minimum number of male flowers per plant (68.70) was recorded with application of 50 % N from FYM + 50 % N from poultry manure (T₁) and it was remain statistically at par with treatment T₂ and T₁. Similar trend in variation in number of male

flowers per plant due to organic manure was earlier reported by Karuppaiah and Kathiravan (2006), Anjanappa *et al.*, (2012) in cucumber and Thriveni *et al.*, (2015) in bitter gourd.

The increase in number of female flower due to application of different organic manure was earlier reported by Karuppaiah and Kathiravan (2006) in cucumber, Mulani *et al.*, (2007) in bitter gourd, Anjanappa *et al.*, (2012) in cucumber Thriveni *et al.*, (2015) in bitter gourd.

Maximum per cent fruit set similar trend of variation in fruit setting per cent due to sources of different organic manure and biofertilizer were earlier reported by Karuppaiah and Kathiravan (2006) in cucumber.

On the basis of field experimentation, it was concluded that to obtain better growth and flowering of cucumber apply 50% castor cake + 50% poultry manure + bio fertilizers (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + Neem oil.

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