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Effect of organic nutrient management on yield and quality of cucumber (*Cucumis sativus* L.)

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Abstract

A field experiment entitled, effect of organic nutrient management on yield and quality of cucumber (*Cucumis sativus* L.) was carried out during summer-2016 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 and evaluated on the basis of yield and quality characteristics of cucumber. Treatment (T₉) 50% N through caster cake + 50% N through poultry manure + biofertilizers + *Trichoderma viride* + neem oil recorded significantly maximum yield and quality parameters viz., number of fruits per plant, average weight of fruit, yield per plant, yield per meter square; as well as quality parameters viz., fruit length and diameter of fruit.

Keywords: Biofertilizers, cucumber, KSM, PSB quality, *Trichoderma viride* and yield

Introduction

Cucumber growing is the most remunerative enterprise as it is adopted on small and marginal holding for high production in short duration. It is a member of family cucurbitaceae, most popularly and widely grown vegetables all over India. Nutritional composition of 100 g edible portion of cucumber fruit water 96.4 g, energy 42 kJ (10 kcal), protein 7 g, fat 1 g, carbohydrate 1.5 g, dietary fibre 6 g, thiamin 0.03 mg, riboflavin 0.01 mg, niacin 0.2 mg and ascorbic acid 2 mg. At present production and consumption of vegetables in our country are very inadequate and meets only about one-fourth to one-third of total requirement. The population being increased without check is the main handicap in our progress which results in food shortage, malnutrition and poverty occurs. Therefore, there is an urgent need to increase the vegetable production by bringing more area under vegetable cultivation and adoption of improved technologies. Use of organic nutrients and bio-fertilizers alone or in combination improves efficiency, efficacy of applied fertilizers (Singh and Biswas, 2000) [10], supplies of essential plant nutrients, improve the physico-chemical properties, increases water holding capacity, encourages the soil microbial activities thus maintains soil health. Organic nutrient management ensure the sustainable production, bioagents as *Trichoderma viride* and neem oil protect the main produce organically from various diseases and pests for enhancing yield and marketable quality to secure handsome price and net higher returns.

Material and Methods

Present experiment was carried out during summer-2016 at Horticulture Instructional Farm, Department of Horticulture, Chimanbhai Patel College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. Total 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 yield and quality were recorded and the mean data were subjected to statistical analysis following analysis of variance technique (Panse and Sukhatme, 1985) [9].

Results and Discussion

Data in Table 1 showed significant difference for yield and quality parameter among different levels of organic nutrient.

Table 1: Effect of organic nutrients on yield and quality parameters

Organic nutrient (F)	Number of fruit per plant	Average weight of fruit (g)	Yield per plant (kg)	Yield per meter square (kg)	Fruit length (cm)	Diameter of fruit (cm)	TSS (°Brix)
T ₁ =50% N from FYM + 50% N from Poultry Manure	10.50	202.86	1.95	2.59	18.30	4.26	2.65
T ₂ =50% N from Neem cake + 50% N from Poultry Manure	11.57	214.18	1.80	2.39	19.27	4.50	2.96
T ₃ =50% N from Castor cake + 50% N from Poultry Manure	11.95	218.83	1.90	2.52	19.67	4.60	2.85
T ₄ =T ₁ + Biofertilizers (<i>Azospirillum</i> + PSB + KSM)	12.92	230.47	2.15	2.85	20.64	4.86	3.55
T ₅ =T ₂ + Biofertilizers (<i>Azospirillum</i> + PSB + KSM)	13.69	239.78	2.04	2.70	21.42	5.05	3.54
T ₆ =T ₃ + Biofertilizers (<i>Azospirillum</i> + PSB + KSM)	14.46	249.09	2.37	3.15	22.20	5.25	3.71
T ₇ =T ₄ + <i>Trichoderma viride</i> + Neem oil	15.61	263.06	2.44	3.24	23.37	5.55	3.54
T ₈ =T ₅ + <i>Trichoderma viride</i> + Neem oil	15.10	267.72	2.43	3.24	23.77	5.65	3.93
T ₉ =T ₆ + <i>Trichoderma viride</i> + Neem oil	16.39	272.37	2.52	3.35	24.16	5.75	3.70
S.Em.±	0.46	4.39	0.43	0.76	0.39	0.07	0.08
C.D. at 5%	1.33	12.63	0.32	0.43	1.13	0.20	0.25
C. V.%	8.33	4.49	12.48	12.58	4.50	3.50	6.34

Effect of organic nutrient on yield and yield attributes

Inspection of data disclosed that significantly maximum number of fruits per plant (16.39) and average weight of fruit (272.37 g) was recorded with application of 50% N from castor cake + 50% N from poultry manure + biofertilizers (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + neem oil (T₉) though, it was statistically at par with treatment T₈ and T₇. The increase number of fruit might be due to availability of nutrient resulted in increase the number of fruit. Variation in number of fruits per plant due to application of different organic manures and biofertilizers were previously reported by Karuppaiah and Kathiravan (2006) [6] in cucumber, Mulani *et al.* (2007) [8] in bitter gourd and Anjanappa *et al.* (2012) [2] in cucumber.

The increase in weight of fruit might be due to improving soil conditions; released adequate nutrient elements for yield enhancement might have increased the synthesis of carbohydrates resulted in increase the weight of fruit. These results are conformity with the findings of Karuppaiah and Kathiravan (2006) [6] and Anjanappa *et al.* (2012) [2] in cucumber, Mulani *et al.* (2007) [8] and Thriveni *et al.* (2015) [12] in bitter gourd.

Maximum yield per plant (2.52 kg) and yield per meter square (3.35 kg) was observed with treatment 50% N from castor cake + 50% N from poultry manure + biofertilizer (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + neem oil (T₉) and it was statistically at par with treatment T₇, T₈ and T₆. The results obtained are in line with the findings of Anjanappa *et al.* (2012) [2] in cucumber.

Effect of organic nutrient on quality parameters

Maximum fruit length (24.16 cm) and fruit diameter (5.75 cm) was recorded with application of 50% N from castor cake + 50% N from poultry manure + biofertilizers (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + neem oil (T₉) and it was at par with treatments T₈ and T₇. This might be due to the organic nutrient favour increase in photosynthesis activity and accumulation of carbohydrates which helps in better fruit growth. Similar variation due to application of organic fertilizers was previously reported by Yadav and Luthra (2004) [13] in watermelon and Das *et al.* (2015) [4] in bottle gourd.

Significantly the maximum TSS (3.93 °Brix) was recorded with application of treatment 50 per cent from Neem cake + 50 per cent from Poultry Manure + Biofertilizer (*Azospirillum*

+ PSB + KSM) + *Trichoderma viride* + Neem oil (T₈), which was statistically at par with treatment T₉.

Use of organic manures and biofertilizers and their combinations are maintaining and sustaining a higher level of soil fertility & crop productivity with higher quality fruits in gherkin (Bindiya *et al.*, 2012) [3]. Potentiality of organic manures for better quality production of various crops has been confirmed by earlier works also Anitha *et al.*, (2003) [1] in melon, Kameswari and Narayanamma (2011) [5] in ridge gourd and Das *et al.*, (2015) [4] in bottle gourd and present results has shown the similar trends. These findings corroborate with the finding of Karuthamani *et al.*, (1995) [7] in pumpkin and Shivashankaramurthy *et al.*, (2007) [11] in gherkin.

Conclusion

It can be concluded that to obtain better yield and quality of muskmelon, it can be grown with application of 50 per cent N from FYM + 50 per cent N from poultry manure + Biofertilizer (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + Neem oil. In case of TSS treatment T₈ has found maximum TSS content 50 per cent from Neem cake + 50 per cent from Poultry Manure + Biofertilizer (*Azospirillum* + PSB + KSM) + *Trichoderma viride* + Neem oil.

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