

Effect of Organic, Inorganic and Biofertilizers on Growth, Yield and Quality Traits of Okra [*Abelmoschus esculentus* (L.) Moench]

Bhagwan Sahay Saini¹, Rakesh Kumar Meena^{2*} and Mukesh Kumar³ and Deepak Nagar⁴

¹Corresponding author, ²Supervisor, ³Co-Supervisor, Member⁴

School of Agricultural Sciences, Department of Horticulture, Career Point University, Kota

*Corresponding Author E-mail: rakeshhorti.meena678@gmail.com

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ABSTRACT

On the basis of present investigation it can be concluded that the application of (75 % RDF and PSB) proved best for growth, Yield and Quality traits of Okra. Highest plant heights 100.55 cm at 90 days after sowing was noted in T₁₅ (75% RDF + PSB), maximum number of fruits 19.33 harvested from the okra plants were counted in T₁₅ (75% RDF + PSB), minimum number of days to first picking 61.60 has been observed in T₁₅ (75 % RDF + PSB), Fruit yield per plant, fruit yield per plot, fruit yield per hectare were the three parameters also in T₁₅ which were compared in this experiment, The highest ascorbic acid 12.66 in T₁₅ (75 % RDF and PSB) and Total soluble solids were found in T₁₅ (75 % RDF + PSB). It is recommended for higher production of okra.

Keywords: Okra, Organic, Inorganic, Bio fertilizers, Growth, Yield, Quality.

INTRODUCTION

Okra (*Abelmoschus esculentus* (L.) Moench) or bhindi and is also known as lady's finger. Okra is powerhouse of variable nutrients. Fresh edible pods provide human supplementary vitamins such as C, A, B complex, iron, calcium proteins and many others. (Benjawan et al., 2007a,b). It is very good source of energy for human diet. It provides 2000 calories while consuming 100g pods. It is not only low in calories but also fat free. Hence, okra is a surprising versatile vegetable. It also holds its high position in the nutritional charts for its fibrous content and other medicinal benefits. The leaves and

young fruits of okra are frequently eaten as green vegetable. It is beneficial as anti ulcer, comparable to a standard drug misoprotol with good results. Its alkaline pH could also contribute to its gastro-intestinal ulcers by neutralizing the digestive acids. *Okra* (*Abelmoschus esculentus* (L.) Moench) is one of the most well-known and utilized species of the family Malvaceae in India as well as United States, Spain. It is one of the essentially consumable crop of the India, immature and tender pods can be consumed as the boiled and fried vegetables or could be utilized as it may be added to salads, soups and stews.

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Considering the expenses and availability of chemical K fertilizers, procurement of alternate indigenous product K ash and limited research work was carried out on this product the present activity of scrutinizing was taken up to traverse the utilization of K ash organic fertilizer as a substitute of chemical K fertilizer and its effect on growth, nutrient uptake and yield of Okra (Pushpavalli et al., 2014). Contains forskolin (diterpinoid), which is being used to treat several diseases which includes - hypertension, glaucoma, asthma, congestive heart failure and certain type of cancer's (D'souza, 1986).

The use of organic applications of materials applied to soil not only improvises its calibration status of nutrients but also reduces the incidence of pest (Adilakshi et al., 2007).

Improvement of soil fertility through the application of fertilizers has become an essential factor that enables the world to feed billions of people of its population (Brady & Weil, 1999).

Soil fertility is usually maintained by the application of organic and inorganic fertilizers and there is also an improvement in the physical and biological properties of the soils.

MATERIALS AND METHODS

An evaluation based experimentation entitled "Effect of Organic, Inorganic and Bio fertilizer on growth, Yield and Quality traits of Okra [*Abelmoschus esculentus* (L.) Moench] cv. Kashi Pragati' was conducted during Rabi 2019-20 at Horticulture Research Farm, School of Agricultural Sciences, Career Point University, Kota, Rajasthan. The soil of experimental field was vertisols and soil pH is 7.68, Electrical conductivity is 0.49 dsm^{-1} and Organic carbon (%) 0.37 (Piper, 1950). The manure and fertilizer application although is based upon the seasons, climatic conditions and soil fertility. 20-30 tons of well decomposed FYM was employed 100 Kg/ha of Nitrogen, 60 kg of P_2O_5 /ha FYM was thoroughly filled with 50 kg K_2O /ha as this much amount is sufficient. The complete dose

of phosphatic and potassic fertilizer and one third dose of nitrogenous fertilizer was applied in the last ploughing. The remaining dose of nitrogenous fertilizer was applied at the last ploughing. In order to avoid leaching losses in the rainy seasons Nitrogen was applied in 4-5 split doses. The experiment considered of 16 treatments viz. T₁ (Control), T₂ (FYM/Compost 50%), T₃ (Vermi compost 100%), T₄ (Neemcake 50%), T₅ (50%RDF+FYM/Compost 50%), T₆ (50%RDF+Vermicompost 50%), T₇ (50%RDF+Neemcake 50%), T₈ (75%RDF+FYM Compost 25%), T₉ (75%RDF+Vermicompost 25%), T₁₀ (75%RDF+Neemcake 25%), T₁₁ (50%RDF+Azobacter 50%), T₁₂ (50%TDF+PSB 50%), T₁₃ (50%RDF+VAM 50%), T₁₄ (75%RDF+Azobacter 25%), T₁₅ (75%RDF+PSB 25%), T₁₆ (75%RDF+VAM 25%) combinations of Organic, Inorganic and Bio-fertilizers were observed on Okra. The observations recorded on 10 characters under growth and yield and 3 of quality in Okra i.e. Days to germination (50%), Days to germination (100%), plant height (cm), Stem diameter (cm), Inter-nodal Length (cm), Number of fruits per plant, Days to first picking, Fruit yield per plant (kg), Fruit yield per plot, Fruit yield per hectare, Bio-Chemical Aspects like TSS (⁰Brix), Ascorbic Acid Content, Sugar (%) etc. at 30,60 or 90DAP.

RESULTS AND DISCUSSION

The best result of the treatments combinations has been observed under the T₁₅ (75% RDF + PSB) followed by T₁₄ (75%RDF + Azotobacter) T₁₅ took minimum days to 50% germination 5.50 respectively .Days to 100 % germination was observed around 10-11 days of sowing, with the T₁₅ (75% RDF + PSB) and minimum number of days 10.30 and 10.10 were used by T₁₅ (75%RDF+PSB), during of the years of experimentation respectively. Similar findings were also reported by Nantha kumar and Veeraraghavathatham (1999) in brinjal. In the present study, the treatment with organics and Bio fertilizers, especially Phosphate Saline Bacteria along with RDF

recorded significantly higher seed yield, followed by the results are in line with the findings of Abdullah Adil Ansari and Kumar Sukhraj (2010).

From each plot five plants were chosen for the calculation of the girth the strongest girth was found to be 2.50 in T₁₅ (75% RDF + PSB) respectively. The weakest girth 1.80 was given by the T₁ (control) when no fertilizer is applied in the years of experimentation. Farmyard manure and vermin compost were also not able to produce good girth result. The application of nitrogen favored the metabolic and auxin activities in plant and ultimately resulted in increased fruit size, number of fruits per plant, fruit weight and yield ha⁻¹. These findings are similar of those reported by in okra crop Garwal et al. (2007).

The maximum plant height 42.40 cm at 30 days after sowing was attained with the combination of T₁₅ (75% RDF + PSB) in the consecutive year, respectively and minimum in control. Mean value 73.90 of plant height at 60 DAS was recorded highest in T₁₅ (75% RDF + PSB) And minimum 53.60 value of plant height has been observed in T₁ (control). Highest plant heights 100.55 at 90 days after sowing was noted in T₁₅ (75% RDF + PSB) and lowest plant heights 87.90 was recorded in T₁ (control) the years of experimentation respectively. The beneficial effect of vermin compost on plant growth might be attributed to the fact that the earthworms mineralize macro and micronutrients during vermin compost and made available to crop plants for longer period. The results are in close conformity with the findings of in okra Peyvast et al. (2007).

The inter nodal length was calculated with the help of the scale and the distance between the two consecutive nodes were calculated. Like other experimentation in this also significant results were found in T₁₅ (75% RDF with PSB) which was found to be 8.26 cm.

The maximum number of fruits 19.33 harvested from the okra plants were counted in T₁₅ (75% RDF + PSB) and the minimum

number of fruits 12.55 and 12.65 were counted in T₁ (control) respectively.

The minimum number of days to first picking 61.60 has been observed in T₁₅ (75% RDF + PSB) and the maximum number of days to first picking has been recorded 66.60 in T₁ (control) respectively.

Fruit yield per plant, fruit yield per plot, fruit yield per hectare were the three parameters which were compared in this experiment. The highest fruit yield 0.275 per plant was obtained in T₁₅ (75% RDF + PSB). The highest yield per plot 5.460 in T₁₅ (75% RDF + PSB) respectively. Highest fruit yield 152.660 per hectare was recorded in T₁₅ (75% RDF + PSB). In addition, they also improve the structure, aeration and water holding capacity of soil. The results are in close conformity with the findings Vanmasthi et al. (2014).

Effect of organic, inorganic manure on Bio fertilizers on Bio chemical parameters

Total soluble solids were out in the okra plant which were treated with organic, inorganic and bio fertilizers. Total soluble solids were found to be higher 3.12 with T₁₅ (75% RDF + PSB). The highest ascorbic acid 12.66 in T₁₅ (75% RDF and PSB) combination the second best result 10.98. It means that combined application of different bio fertilizers specially phsoahate solubilizing Bacteria helped in the maximum yield in Ascorbic acid content Total soluble solids (2.94 Brix) was recorded in treatment T₁₅ (75% RDF + PSB) Mishra et al. (2009) in knolkhol, reported that the TSS content was increased with the increase in the nutrient level in the soil.

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