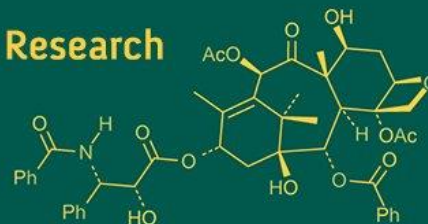
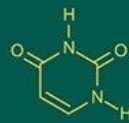


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Influence of biofertilizers on quality and yield of chilli cv Pusa Jwala at different levels of nitrogen and phosphorus

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Abstract

"Effect of biofertilizers on quality and yield of chilli cv Pusa Jwala at different levels of nitrogen and phosphorus" is the title of the current study. The experiment was carried out from 2016 to 2017 at the JNKVV College of Agriculture's Instructional Farm, located in Rewa (M.P.), in the Department of Horticulture. Three replications and a Randomized Block Design were used to set up the experiment. The maximum pericarp thickness (0.97 mm), maximum fruit diameter (1.83 cm), fruit length (8.30 cm), dry weight fruits (2.17 gm), number of fruits per plot (96.67), number of seeds per pod (53.67), test weight (8.13 gm), and other yield parameters such as were all most effectively achieved with 75%NP+100%K+Azotobacter+Azospirillum+PSB+VAM among the various treatments at 15, 45, 75, and 90 DAT. 96.67 q/ha of total fresh output at "The region has a subtropical, semi-arid climate with Madhya Pradesh's agroclimatic zones for summer and winter".

Keywords: Chilli (*Capsicum annum* L.), Azotobacter, PSB, VAM, Azospirillum, quality, and yield

Introduction

One of the major vegetable and spice crops in India is the chilli (*Capsicum annum* L.), which is also one of the most important cash crops in the Solanaceae family. In various sections of South and Middle America, indigenous peoples domesticated the chili at least five times. The compounds that give chili its pungency are capsaicin (C₁₈H₃₇NO₃) and a group of similar compounds known as capsaicinoids. One of the best foods to eat for antioxidant vitamins like A, C, and E is green fruit from sweet peppers and chilies. These vitamins prevent cancer from occurring. Because of the oleoresin extraction process, it is employed for industrial purposes. NP 46 A × Puri Red is the one who developed the Pusa Jwala variation. Fruits are often curled at the tip, long, slender, and crimson in color. Pods are thin, pendent, long (over 10 cm), somewhat pungent, and contain few seeds. prone to nematodes with knotted roots and viral infections. It produces 10–25 q/ha. Oleoresin contains 8.0% capsaicin. Suitable for use across India. It's better suited as green chili. Because they are effective as a plant nutrient store, biofertilizers have positive effects on soil productivity and crop yield. These moderate nutrient sources promote microbial and biological activity in the rhizosphere, enhance root development, and improve soil aeration. Plant growth regulators and beneficial microflora seemed to be the best organic source in sustaining soil fertility on a sustained basis towards an eco-friendly environment, in addition to the delivery of micronutrients being a rich source of macro and micronutrients and vitamins.

Materials and Methods

Site of experimentation

In the academic year of 2016–17, the experiment was carried out in the Instructional Farm of the Department of Horticulture at JNKVV College of Agriculture, Rewa (M.P.).

Experimental material

The Indian Institute of Vegetable Research (IIVR) in Varanasi, Uttar Pradesh provided a variety of Pusa Jwala as the experimental material for this study.

Experimental approach

Three replications of the experiment were carried out using a Randomized Block Design (RBD). Twenty-five-day-old Chilli variety seedlings were moved to the experimental site.

Cultivating Seedlings

The vermi-compost mixture was used to prepare the seed beds. Before being seeded, seeds were treated with Thiram @ 2g/kg of seeds. On October 17, 2016, the seeds were uniformly sown in a separate bed at a depth of 2-3 cm. When necessary, routine plant protection procedures, weeding, and watering were carried out.

Application of fertilizer

According to treatments, 100% of the suggested N:P:K (100:60:80 kg/ha) and FYM 50 were used to grow the crop. The basal dose of phosphorus was full dose, potash was half dose, and nitrogen was half dose. In addition, various FYM and vermicompost were added to each plot's base mix of soil at the same time. Thirty days after transplanting, the remaining half dose of nitrogen was administered. Rows of biofertilizer were sprayed in accordance with the treatment.

Filling in the Gaps

On 03-12-16, gap filling was carried out in order to preserve the ideal plant population per plot. After filling the gaps, the plants received a light irrigation.

The Irrigation System

For the purpose of seedling establishment, minimal irrigation was used. Following the transplant, further irrigations were given as needed to support the plants' growth and development. After a month, the weekly irrigation schedule was extended to ten days. Previously, irrigation was provided as needed.

Cross-cultural Collaboration

Hand weeding was done as and when weeds were noticed in order to keep the experimental plots weed-free. To maintain the soil's porosity and to help the plants grow, a light earthing up was applied.

Notes taken on observations**Thickness of fruit pericarp (mm)**

With the help of Vernier calipers, the thickness of the fruit pericarp was measured in millimeters for each of the three mature fruits that were chosen, and the average thickness was computed.

Fruit width in centimeters

The fruit Using Vernier calipers, the diameter of three selected mature fruits was measured in centimeters for each treatment, and the average fruit girth was computed.

Fruit length in centimeters

Three fully ripe fruits from each plant in a plot were measured, and the average fruit length was then calculated.

Weight in grams of dry red, ripe fruits

After being sun-dried, three ripe red chillies from a chosen plant were selected and weighed. then oven dry for eight hours at 70 °C.

Fruits in each plot

Three randomly chosen plants had their total quantity of completely developed fruits taken and tallied.

Each fruit's seed count

Three fruits were selected, their seeds counted, and an approximate average was calculated.

Test mass (gram)

From tagged plants in each treatment, thousands of seeds were counted before weights were recorded in grams.

Total production of fresh fruit (q/ha)

After the mature fruit was collected, the average weight was calculated and tabulated.

Results and Discussion**Quality and yield parameter****Fruit pericarp thickness**

The results on the plant height are shown in Table 1. the maximum pericarp thickness 0.97 mm was recorded in case of was noted under treatment combination 75% NP+100%K+Azotobacter+Azospirillum+PSB+VAM. Nair and Peter (1990)^[12]; Gowda (2002)^[3]; Natesh *et al.* (2005)^[13];

Fruit diameter

The results is regarding fruit diameter (cm) represented in the Table 2. The maximum fruit diameter was recorded in 1.83 cm was noted under treatment combination 75%NP+100%K+Azotobacter+ Azospirillum+PSB+VAM. Khan *et al.* (2011)^[7]; Aminifard (2012)^[11]; Khan (2012a)^[8];

Length of Fruit

The data regarding Fruit length is represented in the Table 2. The maximum Fruit length observed in 8.30 cm was recorded under treatment combination of 75%NP+100%K+Azotobacter+ Azospirillum+PSB+VAM. Jadhav (2014)^[4]; Kashyap (2014)^[5]; Latha *et al.* (2014)^[9]; Mohammed *et al.* (2014)^[10];

Dry weight of fruits

The results on Dry weight of fruits are represented in the Table 2. The maximum Dry weight of fruits recorded by 2.17 gm was recorded under treatment combination of 75%NP+100%K+Azotobacter+Azospirillum+PSB+VAM. Khandaker *et al.* (2017)^[6] and Reddy *et al.* (2017)^[14].

Per plot number of fruit

The result of Number of fruits per plot is given in Table 2. The maximum number of fruits per plot 96.67 was obtained under treatment combination 75% NP + 100%K+ Azotobacter+ Azospirillum+ PSB+ VAM.

Per fruit number of seeds

The data is regarding Number of seeds per fruit in Table 2. The maximum Number of seeds per fruit 53.67 was recorded under treatment combination of 75%NP+100%K+Azotobacter+ Azospirillum+PSB+VAM.

Test weight

The result of Test weight is given in Table 3. The maximum

test weight is 8.13 gm was recorded under treatment combination of 75%NP+100%K+Azotobacter+Azospirillum+PSB+VAM.

Yield of total fresh Fruits

The result of Total fresh fruit yield is given in Table 3. The

maximum Total fresh fruit yield 96.67 q/ha was recorded under treatment combination of 75%NP+100%K+Azotobacter+Azospirillum+PSB+VAM. Chatterjee and Bandyopadhyay (2014)^[2]; Kashyap (2014)^[5]; Moraditochae (2015)^[11] and Khandaker *et al.* (2017)^[6].

Table 1: Different reproductive treatments have an impact on the quality factors of Chilli

Tr. No	Treatments	Pericarp Thickness of Fruit (mm)	Diameter of Fruit (cm)	Length of Fruit (cm)	Dry weight of Fruit (gm)
T ₁	100% NPK	0.57	1.42	6.45	1.50
T ₂	75%NP+100%K	0.70	1.33	6.40	1.53
T ₃	75%NP+100%K+ Azotobacter	0.87	1.63	7.29	1.67
T ₄	75%NP+100%K+Azospirillum	0.83	1.47	7.13	1.63
T ₅	75%NP+100%K+PSB	0.74	1.50	7.27	1.77
T ₆	75%NP+100%K+VAM	0.77	1.45	7.43	1.73
T ₇	75%NP+100%K+ Azotobacter+ Azospirillum	0.85	1.80	7.63	1.87
T ₈	75%NP+100%K+PSB+VAM	0.90	1.67	7.40	1.83
T ₉	75%NP+100%K+Azotobacter+Azospirillum+PSB+VAM	0.97	1.83	8.30	2.17
T ₁₀	Control	0.33	1.40	6.17	1.23
	S.Em±	0.05	0.07	0.25	0.08
	CD at 5%	0.10	0.15	0.52	0.16

Table 2: Number of seeds per pod, Number of fruit per plot the amount of fresh chili produced (q/ha) and its seed test weight (gm) in relation to various reproductive treatments.

Tr. No	Treatments	No. of fruit plot ⁻¹	No. of seed pod ⁻¹	Seed test weight (g)	Total fresh yield (q/ha)
T ₁	100% NPK	79.67	36.77	6.17	82.47
T ₂	75%NP+100%K	86.25	41.33	5.43	83.75
T ₃	75%NP+100%K+Azotobacter	87.53	42.33	5.17	87.81
T ₄	75%NP+100%K+Azospirillum	87.33	40.45	5.77	86.32
T ₅	75%NP+100%K+PSB	93.33	40.87	6.53	87.73
T ₆	75%NP+100%K+VAM	89.77	47.77	7.17	85.76
T ₇	75%NP+100%K+Azotobacter+Azospirillum	95.33	49.33	7.33	93.41
T ₈	75%NP+100%K+PSB+VAM	94.33	47.67	6.99	91.24
T ₉	75%NP+100%K+Azotobacter+Azospirillum+ PSB+ VAM	96.67	53.67	8.13	96.67
T ₁₀	Control	75.77	35.77	4.67	81.80
	S.Em±	1.24	0.85	0.53	1.01
	CD at 5%	2.55	1.75	1.10	2.08

Recognition

The author expresses gratitude to Jawaharlal Nehru Krishi Vishwa Vidyalaya, Rewa, Madhya Pradesh's research guide, department head, and staff for providing the facilities needed to carry out the experiment. A special thank you to the friends and family for their unwavering support.

Conclusion

The current study is titled "Effect of biofertilizers on quality and yield of chilli cv Pusa Jwala at different levels of nitrogen and phosphorus". The JNKVV College of Agriculture's Instructional Farm in Rewa, M.P., in the Department of Horticulture, was the site of the experiment from 2016 to 2017. The experiment was set up using a Randomized Block Design with three replications. The combinations of 75%NP+100%K+Azotobacter+Azospirillum+PSB+VAM were the most effective in achieving the maximum pericarp thickness (0.97 mm), maximum fruit diameter (1.83 cm), fruit length (8.30 cm), dry weight fruits (2.17 gm), number of fruits per plot (96.67), number of seeds per pod (53.67), test weight (8.13 gm), and other yield characteristics, such as were all best attained at 15, 45, 75, and 90 DAT with 75%NP+100%K+Azotobacter+Azospirillum+PSB+VAM) among the different treatments. "The region has a

subtropical, semi-arid climate with Madhya Pradesh's agroclimatic zones for summer and winter." = 96.67 q/ha of total fresh output.

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