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INFLUENCE OF DIFFERENT LEVELS OF BIOFERTILIZERS AND JEEVAMRIT ON GROWTH AND YIELD PARAMETERS OF GUAVA (*PSIDIUM GUAJAVA* L.)

Astha[1*], P.K.S. Gurjar[1], I.S. Naruka[1], R.K. Jaiswal[1], Ramawatar Choudhary[1], Deepanshi Deora[1], Hemant Kumar Meena[1] and Nindiya Bharti[2]

[1]Department of Horticulture, Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya., Gwalior (M.P.), India, 474002

[2]Division of Vegetable Science, Sher-e-Kashmir University of Agricultural Sciences and Technology Kashmir, Srinagar, India, 190025

*Corresponding author E-mail: narayanesha8@gmail.com

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ABSTRACT

The present study was performed during two-year experiment 2023-24 and 2024-25 to investigate the impact of different level of biofertilizer and Jeevamrit on growth and yield parameters of guava (*Psidium guajava* L.) viz., revealed that the application of biofertilizer Azotobacter 300 ml/tree + PSB 300 ml/tree + KSB 300 ml/tree (B3) significantly improved fruit length (6.46 cm), fruit width (5.37 cm), fruit weight (268.09 g) and fruit volume (132.46 ml) number of fruits (11.63/branch), Fruit yield (34.06 kg tree^{-1}) and Fruit yield (156.17 q/ha) compared to other treatments followed by Azotobacter 250 ml/tree + PSB 250 ml/tree + KSB 250 ml/tree (B2) and the application of Jeevamrit significantly influenced growth parameters of guava. The highest fruit length (6.38 cm), fruit width (5.30 cm), fruit weight (263.87 g) and fruit volume (130.88 ml) were recorded in J3 (Jeevamrit @ 3.125 L/tree) followed by J2 (2.5 L/tree), number of fruits (11.49/branch), Fruit yield (33.34 kg tree^{-1}) and Fruit yield (154.31 q/ha) respectively.

Key *words*: Biofertilizers; fruit quality; guava; jeevamrit; Yield

Introduction

Guava (*Psidium guajava* L.), a member of the family Myrtaceae, is one of the most important fruit crops in tropical and subtropical regions. It is widely cultivated in India, Brazil, Mexico and several Asian countries due to its hardy nature, high productivity and nutritional richness. Popularly known as the “poor man’s apple,” guava is a rich source of vitamin C, pectin, minerals, and antioxidants, making it affordable and nutritionally valuable. In India, guava ranks fourth in area and production among fruit crops, covering 265 thousand hectares with an annual output of 4054 thousand tons and a productivity of 15.3 MT ha^{-1}. In Karnataka, it occupies 7.18 thousand hectares with 140.23 thousand MT production and a productivity of

19.52 MT ha^{-1} (Anonymous, 2018). Despite its commercial importance, guava orchards often face declining productivity due to poor soil fertility and indiscriminate use of chemical fertilizers.

Biofertilizers, which are preparations containing beneficial microorganisms, have gained attention as eco-friendly alternatives to chemical fertilizers. They enhance nutrient uptake, improve soil stability, recycle nutrients, promote symbiotic associations, and aid in bioremediation of contaminated soils (Rivera-Cruz *et al*., 2008). Jeevamrit, a liquid organic formulation prepared from cow dung, cow urine, jaggery, pulse flour, and soil, acts as a rich microbial inoculant and source of nutrients. It improves soil fertility and crop productivity by stimulating microbial activity (Brar *et al*., 2019; Sandhyarani *et al*., 2022).

Although both biofertilizers and Jeevamrit have shown positive effects when used individually, limited information is available on their combined application in guava

Table 1: Effect of Biofertilizers and Bio stimulant on growth and yield parameters of guava.

Treatments	Growth parameters					Yield parameters		
	FL	FW	FWt	FV	FDB	NFPB	FY	FYq
A. Biofertilizers								
B0-Control (No biofertilizers)	5.09	4.24	216.84	104.41	44.48	9.17	21.91	123.06
B1-*Azotobacter* 200ml/tree + PSB 200ml/tree + KSB 200ml/tree	5.74	4.78	246.13	117.82	28.64	10.35	26.92	138.86
B2-*Azotobacter* 250ml/tree + PSB 250ml/tree + KSB 250ml/tree	5.94	4.94	255.10	121.96	24.78	10.71	28.84	143.62
B3-*Azotobacter* 300ml/tree + PSB 300ml/tree +KSB 300ml/tree	6.45	5.37	268.09	132.46	22.25	11.63	34.06	156.17
SEm±	**0.15**	**0.12**	**6.52**	**2.99**	**0.90**	**0.26**	**1.40**	**3.83**
CD (p=0.05)	**0.42**	**0.35**	**18.84**	**8.64**	**2.60**	**0.76**	**4.06**	**11.07**
B. Jeevamrit								
J0 – Control (No jeevamrit)	5.22	4.35	223.00	107.13	46.11	9.41	22.89	126.30
J1 – Jeevamrit @ 1.90 L/tree	5.75	4.78	246.82	118.08	30.04	10.37	27.16	138.94
J2 – Jeevamrit @ 2.5 L/tree	5.88	4.89	252.48	120.55	23.35	10.59	28.34	142.16
J3 – Jeevamrit @3.125 L/tree	6.38	5.30	263.87	130.88	20.64	11.49	33.34	154.31
SEm±	**0.15**	**0.12**	**6.52**	**2.99**	**0.90**	**0.26**	**1.40**	**3.83**
CD (p=0.05)	**0.42**	**0.35**	**18.84**	**8.64**	**2.60**	**0.76**	**4.06**	**11.07**

FL: Fruit length (cm); **FW:** Fruit width (cm); **FWt:** Fruit weight (g); **FV:** Fruit volume (ml); **FDB:** Fruit drop per branch (%); **NFPB:** Number of fruits per branch; **FY:** Fruit yield (kg tree^{-1}); **FYq:** Fruit yield (q/ha)

orchards. Integration of these inputs may provide synergistic benefits by enhancing nutrient solubilization, microbial proliferation, and nutrient absorption, thereby improving yield and quality. Such practices can reduce input costs, maintain ecological balance, and promote long-term orchard sustainability (Kadam *et al.*, 2021). Considering the growing emphasis on eco- friendly production, there is a strong need to evaluate the combined use of biofertilizers and Jeevamrit in guava under different agro-ecological conditions.

Materials and Methods

The study was conducted on guava (Psidium guajava L.) cv. G-27 at the Fruit Orchard, Department of Horticulture, College of Agriculture, Gwalior (M.P.) during 2022-23 and 2023-24. "The experimental site is situated at 211.5 m AMSL, at 26°132 N latitude and 78°142 E longitude, falling under the sub-tropical climate of Gwalior, Madhya Pradesh. The region receives an average annual rainfall of about 900 mm, with 70–75% concentrated between June and early October. The climate is characterized by hot, dry summers, humid monsoons, and cold winters." The experiment was laid out in a factorial randomized block design with sixteen treatment combinations comprising four levels of biofertilizers (Factor A) and four levels of Jeevamrit (Factor B)

Factor A – Biofertilizers:

- B0: Control (no biofertilizers)
- B1: Azotobacter 200 ml/tree + PSB 200 ml/tree + KSB 200 ml/tree
- B2: Azotobacter 250 ml/tree + PSB 250 ml/tree + KSB 250 ml/tree
- B3: Azotobacter 300 ml/tree + PSB 300 ml/tree + KSB 300 ml/tree

Factor B – Jeevamrit:

- J0: Control (no Jeevamrit)
- J1: 750 L/ha (1.90 L/tree)
- J2: 1000 L/ha (2.50 L/tree)
- J3: 1250 L/ha (3.125 L/tree)

Prepared solutions of biofertilizers and Jeevamrit were applied as foliar sprays at the pea stage of fruit development. Spraying was performed in the afternoon (16:00–18:00 h) using a pneumatic foot sprayer, applying 10 L solution per tree to ensure complete foliage coverage. Polythene sheets were placed beneath trees to prevent spray runoff onto the soil.

Observations were recorded on growth parameters including fruit length (cm), fruit width (cm), fruit weight (g), fruit volume (ml) and fruit drop (% per branch), as well as yield parameters including number of fruits per branch, fruit yield per tree (kg/tree), and yield per hectare (q/ha). Fruit yield per tree was calculated by multiplying the average fruit weight by total number of fruits per tree. Collected data were analyzed statistically as per Panse and Sukhatme (1985) to determine treatment effects.

Results and Discussion

Effect of biofertilizers on growth parameters

The pooled data (Table 1) and (Fig. 1) revealed that biofertilizer application significantly influenced growth parameters of guava. The maximum fruit length (6.46

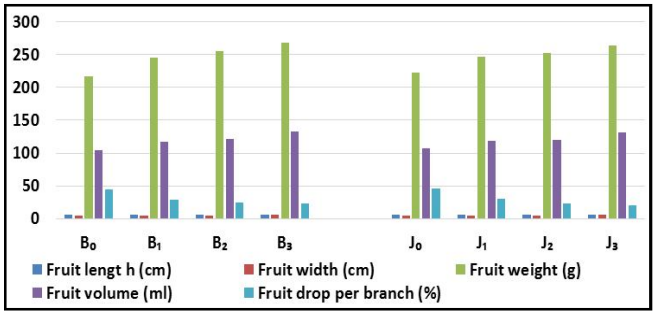

Fig. 1: Effect of Biofertilizers and Bo stimulant of growth and yield parameters of guava.

cm), fruit width (5.37 cm), fruit weight (268.09 g), and fruit volume (132.46 ml) were recorded under B3 (Azotobacter 300 ml/tree + PSB 300 ml/tree + KSB 300 ml/tree), followed by B2 (Azotobacter 250 ml/tree + PSB 250 ml/tree + KSB 250 ml/tree). The improvement in fruit size and weight under B0 may be attributed to enhanced nutrient uptake and balanced availability of nitrogen, phosphorus, and potassium mediated by microbial inoculants. Azotobacter contributes to nitrogen fixation and phytohormone production, PSB enhances phosphorus availability crucial for flower initiation and fruit set, while KSB improves fruit enlargement and sugar accumulation. These findings are in agreement with Karanveer *et al*., (2024) and Kaladhar Babu *et al*., (2023).

Fruit drop per branch was highest in control (B0, 44.48%) and lowest under B3 (22.25%), indicating that biofertilizer application reduces premature fruit abscission by improving carbohydrate metabolism, hormonal regulation, and cell wall strength, as also reported by Karanveer *et al*., (2024) and Kaladhar Babu *et al*., (2023).

Effect of Jeevamrit on growth parameters

Jeevamrit application significantly influenced fruit growth. Maximum fruit length (6.38 cm), width (5.30 cm), weight (263.87 g), and volume (130.88 ml) were recorded under J3 (3.125 L/tree), followed by J2 (2.5 L/tree). Similarly, fruit drop was highest in control (J0, 46.11%) and lowest in J3 (20.64%). The enhancement in growth parameters under Jeevamrit may be due to increased soil microbial activity, nutrient mineralization, and production of growth- promoting substances, supporting nutrient uptake and assimilation (Kaur and Kaur, 2017; Afreen *et al*., 2024; Gohil *et al*., 2025).

Effect of biofertilizers on yield parameters

The pooled data (Table 1) and (Fig. 2) revealed that biofertilizer application significantly improved yield attributes. The highest number of fruits per branch (11.63), fruit yield per tree (34.06 kg), and yield per hectare

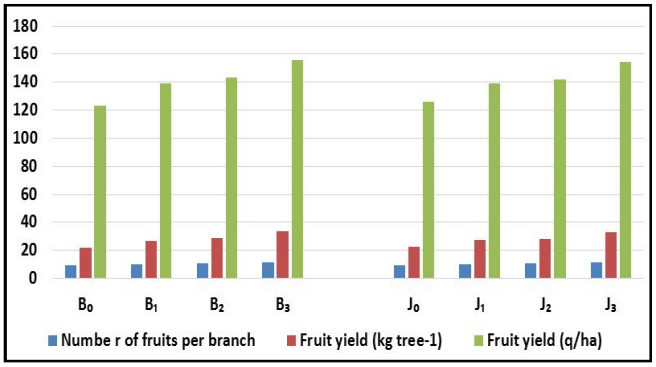

Fig. 2: Effect of Biofertilizers and Bo stimulant on yield parameters of guava.

(156.17 q) were recorded under B3. Enhanced yield can be ascribed to synergistic microbial activity, including nitrogen fixation by Azotobacter, phosphorus solubilization by PSB, and potassium mobilization by KSB, which increased nutrient uptake, photosynthetic efficiency, and assimilate translocation (Kaladhar Babu *et al*., 2023; Karanveer *et al*., 2024).

Effect of Jeevamrit on yield parameters

Similarly, Jeevamrit application significantly improved yield. Maximum fruit number (11.49/branch), yield per tree (33.34 kg), and yield per hectare (154.31 q) were observed under J3, likely due to enhanced soil microbial activity, nutrient availability, and improved plant physiological efficiency (Sandhyarani *et al*., 2022; Dalal *et al*., 2004; Sheikh and Rao, 2005). Overall, combined application of higher doses of biofertilizers and Jeevamrit synergistically improved growth, fruit retention, and yield in guava orchards, highlighting their potential for sustainable orchard management.

Conclusion

The present study demonstrated that the application of biofertilizers and Jeevamrit significantly enhanced growth, fruit retention, and yield of guava. Maximum improvements were observed with Azotobacter 300 ml/tree + PSB 300 ml/tree + KSB 300 ml/tree (B3) and

Jeevamrit 3.125 L/tree (J3), indicating synergistic effects on nutrient uptake, microbial activity, and physiological efficiency. The treatments also effectively reduced fruit drop, contributing to higher productivity and better-quality fruits. Therefore, the combined use of higher doses of biofertilizers (B0) and Jeevamrit (J0) may be recommended for sustainable guava cultivation to achieve enhanced yield and fruit quality.

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