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EFFECT OF FOLIAR APPLICATION OF BIO-ENHANCERS ON THE GROWTH PARAMETERS OF BRINJAL (*SOLANUM MELONGENA* L.) CV. PUSA PURPLE LONG: A VEDIC KRISHI EXPERIMENTAL STUDY

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ABSTRACT

The present study was conducted to evaluate the effect of foliar application of bio-enhancers namely panchagavya, jeevamrut, beejamrut and cow urine on vegetative parameters of brinjal. The experiment was carried out at the Horticulture Research Farm, Chaudhary Charan Singh University, Meerut, Uttar Pradesh during the years 2021-22 and 2022-23. The experiment was laid out in Randomized Block Design with three replications. A total of seventeen treatments were included, comprising different concentrations of Panchagavya (2%, 4%, 6% and 8%), Beejamrut (2%, 4%, 6% and 8%), Jeevamrut (2%, 4%, 6% and 8%) and cow urine (10%, 20%, 30% and 40%), along with a control treatment (distilled water). The bio-enhancers were applied as foliar spray at three different growth stages *i.e.* 30, 40 & 75 days after transplanting. Among all the treatments, maximum plant height (86.65 cm), number of branches per plant (6.11), number of leaves per plant (95.92), leaf length (14.17 cm), leaf width (6.79 cm) fresh weight of plant (1089.05g) and dry weight of plant (185.13g) were rescored under foliar application of Panchagavya @ 4%. However maximum stem diameter (1.88 cm), and root length (57.92 cm) were noted with the foliar spray of Jeevamrut 8%. Beejamrut and cow urine foliar spray were also found significant to enhance vegetative growth of brinjal as compared to control treatment in the study. In contrast, the control treatment (distilled water) showed the minimum vegetative growth.
Keyword **:** Brinjal, Vegetative, bio-enhancers Panchagavya, Jeevamrut, Cow urine.

Introduction

Among the vegetable crops, brinjal (*Solanum melongena* L.) is an important herb with erect or semi spreading habit belongs to family solanaceae and having chromosome number (2n=24). Brinjal also known as aubergine or eggplant is popularly designated as the poor man's vegetable due to its low-cost production, ease of cultural operations and availability around the year (Som and Maity, 2002). Brinjal is cultivated throughout the year and provides good income to farmers (Kasera *et al*., 2018). It is a rich source of carbohydrates, sulfur, chlorine and iron (Lopez *et al*., 2020). Brinjal fruits contain fibre, calcium, protein, phosphorus, iron, and vitamins A, B, and C. It is also used to control high blood cholesterol (Daunay and Hazra, 2012). Brinjal fruits are widely consumed in a variety of culinary dishes across the world, where tender fruits are used as cooked vegetables (fried, boiled, and roasted). In addition, they are processed into pickles and various dehydrated products. According to Ayurvedic medicine, brinjal is considered beneficial for diabetic patients and is also recommended as a remedy for liver disorders (Shukla and Naik, 1993).

In India, the total area under brinjal cultivation was 683.14 thousand hectares, which yielded about 12998.37 thousand tonnes of produce (2023-24). This results in an average productivity of approximately 19.03 tonnes per hectare. In Uttar Pradesh, brinjal is cultivated on 9.53 thousand hectares with 343.46 thousand MT production and 36.03 MT ha productivity. *Horticultural Statistics at a Glance* 2024

Cow based bio enhancers such as panchagavya, jeevamrut, and beejamrut and cow urine are natural, cost-effective and eco-friendly superior alternative to chemical fertilizers and pesticides for sustainable crop production. They contain a good amount of all essential nutrient elements of plants, beneficial micro-organism and plant growth promoting substances. Among all cow-based bio-enhancers, panchagavya and jeevamrut have their own significant efficiency to enhance vegetative growth and yield of crops as reported by many researches. Natarajan, 2002 reported that panchagavya and other cow-based bio-enhancers contain important nutrients, beneficial microorganisms and natural growth promoting substances, which help in better growth and yield of crops. In contrast of Vedic period, Indian sages have explained the importance of cow and cow-based products in agriculture and human health. Maharshi Vasishtha described the cow as Kamdhenu, which provides many useful products for human welfare, while Maharshi Dhanvantari mentioned the importance of Panchagavya in the ancient Indian literature. In traditional Vedic agriculture and Vrikshayurveda, these cow-based products were used to improve soil fertility, plant growth and crop yield.

Foliar spray is recognized as an important method of fertilization, since foliar nutrients usually penetrate the leaf cuticle or stomata and enters the cell facilitating easy and rapid utilization of nutrient (Latha and Nandanssababababy, 2003). Panchagavya is an effective organic growth stimulant which improves plant growth, protect plants from disease and enhances the nutritional quality of fruits and vegetables. It contains essential macro and micronutrients along with natural plant growth hormones such as indole acetic acid (IAA) and gibberellic acid (GA), which help in better growth and development of plants (Perumal *et al*., 2006). The application of this liquid bio-formulations increases the population of beneficial microorganisms, improves soil enzymatic activity and promotes plant growth in a natural and eco-friendly manner Sreenivasa *et al.* (2010).

Bio-enhancers are organic preparations obtained through the fermentation of cow-based product. They are rich in microbial consortia, macro- and micronutrients, and plant growth promoting substances. These help in improving soil fertility, enhancing plant vigour, and increasing crop productivity (Pathak and Ram, 2012). Jeevamrut is made by fermenting cow dung, urine, jaggery, pulse flour, and virgin soil in simple facilities made in the village at minimal cost. Jeevamrut is a nutrient-dense bio-formulation that incorporates helpful microbial communities. It provides readily available NPK and micro-nutrients as well as a good source of plant growth-promoting substances, which enhance plant height, biomass and significantly better yield Palekar (2006). Jeevamrut increases soil microbial activity and nutrient availability, which enhances plant growth and yield. Saharan *et al.* (2023). Jeevamrut is a rich source of beneficial microorganisms such as azospirillum, phosphorus solubilizing bacteria, pseudomonas etc., which increase microbial activity in the soil and help in making nutrients available to plants (Devakumar *et al.*, 2008).

Foliar application of cow urine is an effective method of nutrient supply to plants. It has been found to improve plant resistance against various pathogens and insect pests. Additionally, it promotes the activity of beneficial soil microorganisms, leading to improved plant growth and higher yield (Ambigalakshmi *et al*., 2023). Beejamrutha, a mixture of cow dung, cow urine, water, lime, and soil, has been used in sustainable agriculture since ancient times. It is an effective organic formulation that promotes plant growth (Sreenivasa *et al*., 2009).

Materials and Methods

A field experiment was conducted for two consecutive years (2021-22 and 2022-23) at the Horticulture Research Farm, Chaudhary Charan Singh University, Meerut, Uttar Pradesh, to study the effect of foliar application of bio-enhancers on growth, yield parameters of brinjal (*Solanum melongena* L.) cv. Pusa Purple Long under Long 'A Vedic Krishi Experimental Study'. Geographically, Meerut is located in the western part of Uttar Pradesh, about 70 km away from New Delhi, at 29.90° N latitude and 77.43° E longitude with an altitude of about 222 meters above mean sea level. The region falls under a subtropical climatic zone characterized by hot summers and cool winters. The soil of the experimental field was analyzed before the start of the experiment in both years to determine the initial soil fertility status. The soil of the experimental field was sandy loam in texture with pH 7.60, medium in available nitrogen and low in organic carbon, available phosphorus and potassium. The experiment was laid out in randomized block design (RBD) with three replications. The experiment consisted of seventeen treatments viz., T_1 (Control), T_2 (Panchagavya 2%), T_3 (Panchagavya 4%), T_4 (Panchagavya 6%), T_5 (Panchagavya 8%), T_6 (Beejamrut 2%), T_7 (Beejamrut 4%), T_8 (Beejamrut 6%), T_9 (Beejamrut 8%), T_{10} (Jeevamrut 2%), T_{11} (Jeevamrut 4%), T_{12} (Jeevamrut 6%), T_{13} (Jeevamrut 8%), T_{14} (Cow urine 10%), T_{15} (Cow urine 20%), T_{16} (Cow urine 30%) and T_{17} (Cow urine 40%). The

treatments were applied as foliar sprays at 30, 45 and 75 days after transplanting. Healthy and uniform seedlings of brinjal cv. Pusa Purple Long were raised on well-prepared nursery beds enriched with well-decomposed farmyard manure. 30 days old seedlings were subjected to transplant in well-prepared plots in the main field at a spacing of 60×60 cm. Standard cultural operations such as irrigation, weeding, thinning and plant protection measures were carried out uniformly to maintain a healthy crop. Observations were recorded on important vegetative growth parameters including plant height (cm), number of leaves per plant, number of branches per plant, fresh and dry weight of plant (g) stem diameter (cm) and root length (cm). Five plants were randomly chosen from each treatment for recording observations. The data recorded during the present investigations were subjected to statistically analysis using the Microsoft-Excel and OPSTAT packages (Sheron *et al*., 1998). The mean value of data was be used for the analysis of variance (ANOVA) as described by Panse and Sukhatmae (2000) by using randomized block design (RBD) with 't' treatments and 'r' replications.

Preparation of panchagavya

Panchagavya was prepared in the laboratory, Department of Horticulture Choudhary Charan Singh University Campus, Meerut. Panchagavya was prepared by following standard procedure in which nine ingredients such as cow urine, cow dung, cow ghee, cow milk, cow curd, sugarcane juice, ripe banana and tap water were used. First of all, a mixture (mixture -A) was prepared by mixing fresh cow dung and cow ghee in 10:1 ratio and left this mixture for incubation for three days. On the fourth day, another mixture (mixture- B) in which cow urine and tap water in 10:3 ratio was mixed thoroughly. After that both mixtures (mixture –A & mixture -B) mixed thoroughly and stored for 15 days with regular stirring during morning and evening at least five minutes. After 15 days a new mixture (mixture - C) of cow milk, cow curd, coconut water and sugarcane juice in 3:2:3:1.5 ratio respectively, with 12 ripe bananas were prepared. After that this mixture (mixture - C) was added in the last mixture (mixture -A & mixture -B) and then stored in a plastic container and kept in the shade place at room temperature for 15 more days. Overall, this procedure was taken 30 days to prepare panchagavya. Before foliar spray this mixture of panchagavya was filtered through Whatman filter paper to remove any particle that may block the nozzle of sprayer.

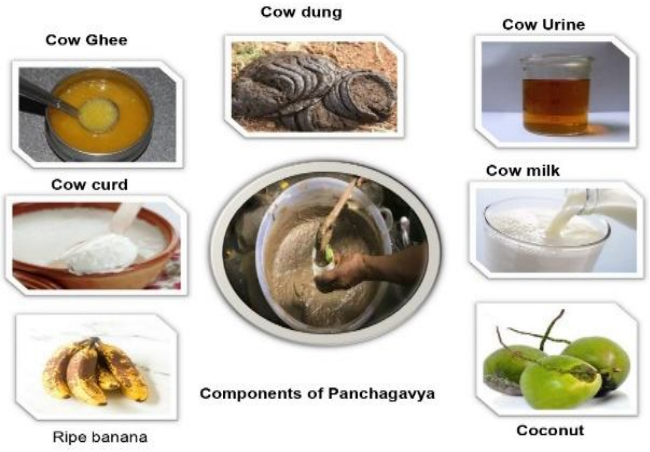

Fig. 1: Substances used for preparation of panchagavya

Preparation of jeevamrut

Jeevamrut preparation involves a simple yet effective process using readily available farm-based ingredients. To begin with, fresh cow dung (10 kg) and cow urine (10 liters) were added to 200 liters of water and mixed thoroughly. In a separate container, jaggery (1.5 kg), pulse flour such as chickpea flour (1.5 kg), and a handful of live soil (about 100 g) were also dissolved in water. Both solutions were then combined and stirred properly every morning and evening for four consecutive days to promote the growth of beneficial microorganisms. On the fifth day, the fermented mixture is filtered to obtain a clear liquid.

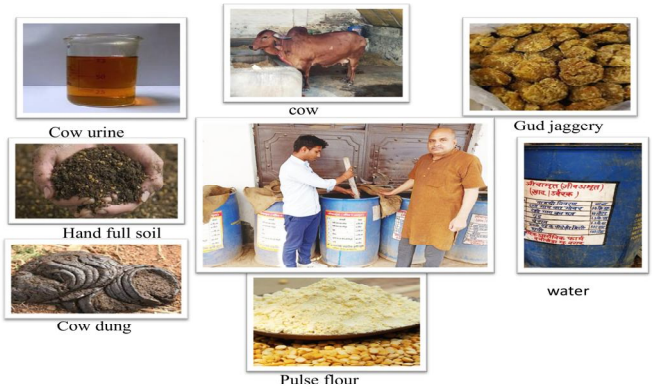

Fig. 2: Substances used for making Jeevamrut

Preparation of beejamrut

Beejamrut preparation begins by hanging 5 kg of fresh cow dung in 20 liters of water for about 12 hours, allowing the essential microorganisms and nutrients to leach into the water. Simultaneously, limewater was prepared by dissolving 50 grams of lime in 1 liter of water and keeping it overnight for proper settling. After 12 hours, the cow dung bundle was squeezed three times into the same water to extract the enriched microbial content. To this solution, a handful of bund soil was added and stirred thoroughly to introduce

native beneficial microbes. Finally, 5 liters of cow urine and the prepared limewater were mixed into the solution and stirred well.

Cow urine collection

Fresh cow urine of desi Gir breed was procured from authorized dairy farm and stored in a sterile container. The urine was filtered through Whatman number 1 filter paper to remove any particles and precipitated material then stored in an airtight container room temperature before use. For foliar application, filtered cow urine diluted in different concentration as per the treatments.

Result and Discussion

Vegetative parameters play a vital role to determine plant biomass production and overall crop productivity. Plant height recorded at different growth stages *i.e*., 40, 60 days after transplanting and at harvesting was significantly influenced by the foliar application of bio-enhancers during both the years of study (table 1). The maximum plant height at 40 DAT (43.60 cm and 42.94 cm), 60 DAT (71.10 cm and 70.07 cm) and at harvesting (86.65 cm and 85.96 cm) was recorded under the foliar application of Panchagavya 4% (T_3), which was found statistically at par with Jeevamrut @ 8% during 2021-22 and 2022-23, respectively, whereas the minimum plant height was recorded under the control treatment. Similar results were reported by Rathore *et al.* (2022) in brinjal. Likewise, Swarnam *et al.* (2016), who observed increased plant height in brinjal with foliar application of Panchagavya @ 3%. Similarly, Swain *et al.* (2015) and Panda *et al.* (2020) noted significant impact of foliar application of bio enhances like panchagavya and jeevamrut on plant height in case of capsicum and tomato, respectively. The significant increment in plant height of brinjal might be due to the foliar spray of bio enhancer specially because panchagavya and jeevamrut are rich sources of essential plant nutrients and act as growth promoting substances. In addition, panchagavya has been reported to contain natural plant growth regulators such as auxins, gibberellins and cytokinins that stimulate cell division, cell elongation and photosynthetic activity in plants. These traditional Vedic bio-enhancers contain macro and micro nutrients, vitamins, essential amino acids and beneficial microorganisms which improve plant growth and development (Palekar, 2006; Natarajan, 2007; Sreenivasa *et al.*, 2010).

Similarly, the maximum number of leaves per plant at 40 DAT (27.09 and 26.73), 60 DAT (75.59 and 74.88) and at harvesting (95.92 and 93.52) was recorded under the foliar application of Panchagavya @ 4%, followed by Jeevamrut 8% and Cow urine 10% (Table 2). Similar results were reported by Rakesh *et al.* (2017), who reported that foliar application of Panchagavya @ 3% significantly increased the number of leaves in okra. In 2025, Sharma *et al.* also reported that foliar application of Panchagavya @ 4% significantly increased the number of leaves per plant in okra. The significant increase in the number of leaves per plant might be due to panchagavya contain a good amount of N, P, K, micronutrient and some growth promoting substance (Natarajan, 2002). These substances stimulate cell division and meristematic activity, which leads to the formation of more shoots and leaves. Nitrogen present in these formulations plays a key role in chlorophyll formation and vegetative growth, thereby promoting the development of a higher number of leaves. Boraiah *et al*. (2017).

The number of branches per plant at different growth stages 40, 60 DAT and at harvesting was significantly influenced by the foliar application of bio-enhancers (table 3). The maximum number of branches per plant at 40 DAT (2.91 and 2.89), 60 DAT (4.15 and 4.08) and at harvesting (6.11 and 6.05) was recorded under Panchagavya @ 4% (T_3), followed by T_{13} (Jeevamrut 8%) while the minimum was recorded under control treatment during both the years 2021-22 and 2022-23, respectively. These findings are in conformity with Mohan, (2008) who reported a significant improvement in the number of branches per plant with foliar application of Panchagavya (3% and 5%), and Amritpani (3% and 5%) in case of brinjal. Devi *et al.* (2023) also observed more number of branches in green brinjal with foliar application of panchagavya. The growth-promoting effect of panchagavya may be attributed to the presence of plant growth regulators such as indole acetic acid and GA_3 which, stimulate physiological processes and enhance growth and development in plants (Gore and Sreenivasa 2011). Panchagavya also contains growth regulatory substances such as IAA, GA_3, cytokinins and essential plant nutrients, which have a significant influence on plant growth rate and overall plant development reported by Perumal *et al*. (2006).

The findings of the present study indicated that foliar application of bio-enhancers significantly influenced leaf length and leaf width in brinjal (Table 5). The maximum leaf length (14.17 cm and 12.93 cm) and leaf width (6.79 cm and 6.66 cm) were recorded under Panchagavya @ 4% followed by Jeevamrut @ 8% during 2021-22 and 2022-23, respectively, whereas the minimum leaf size was observed in the control treatment. Supporting findings were reported by Devi *et al.* (2023), who observed a significant increase in

leaf length of green brinjal under foliar application of @ 2.5 % panchagavya. Leaf size of plants relay on a coordinated process of cell division and subsequent cell expansion. This complex process depends on genetics, hormonal balance and nutritional factors of plants. Panchagavya contains essential plant nutrients and growth hormones that play an important role to speed up the cell division and cell elongation process (Perumal *et al*., 2006). Similarly, the foliar application of panchagavya might have improved leaf width due to its rich microbial population and nutrient content. (Yadav and Lourduraj, 2006)

Root length and stem diameter are an important parameter which reflects the efficiency of the root system in absorbing water and nutrients from the soil. The maximum stem diameter (1.88 cm and 1.81 cm) and root length (57.92 cm and 56.04 cm) were observed under the treatment T_{13} (Jeevamrut 8%) followed by T_3 (Panchagavya 4%) in both years 2021-22 and 2022-23, respectively (table 4). The increase in stem diameter under panchagavya application might be attributed to enhanced cell division and cell enlargement in the stem tissues. Improved physiological efficiency of plants under panchagavya treatment may stimulate cambial activity, leading to increased deposition of vascular tissues and strengthening of the stem. This enhanced vascular development may contribute to greater stem thickness. The increased root length observed under foliar application of jeevamrut might be attributed to improved physiological and metabolic activities in plants. Foliar spray of jeevamrut may enhance nutrient absorption through leaf tissues, which improves overall plant nutrition and stimulates better growth of both shoot and root systems. Improved nutritional status of plants may promote cell division and elongation in root tissues, resulting in increased root length. The beneficial effect of jeevamrut on plant growth and yield might be due to the presence of plant growth promoting substances like IAA and GA_3, along with macro and micronutrients and a large number of beneficial microorganisms present in jeevamrut (Naveena *et al.*, 2019; Chongre, 2019). Jeevamrut also increases microbial activity in the soil, which helps in making nutrients available to plants and improves nutrient uptake. This results in better plant growth, higher biomass and increased yield of the crop (Patel, 2018; Onte, 2019).

The maximum fresh weight of plant (1089.05 g and 1007.67g) and dry weight of plant (185.13 g and 171.30 g) were noted under treatment T_3 (Panchagavya 4%) followed by T_{13} (Jeevamrut 8%) in both years 2021-22 and 2022-23, respectively (table- 4). These results are in close conformity with the findings of Sharma *et al*. (2025), who also reported a significant improvement in fresh weight of okra with the foliar application of Panchagavya at 2% and 4%. The increase in fresh weight of plant might be due to higher water content and increased cell turgidity in plant tissues under the influence of bio-enhancers. The application of panchagavya and jeevamrut might have improved root growth and nutrient uptake, which resulted in increased absorption of water and minerals, thereby increasing the fresh weight of the plant. The increase in dry weight of plant might be due to higher dry matter accumulation, increased synthesis of carbohydrates and efficient translocation of photosynthates from source to sink under the influence of bio enhancers.

Conclusion

In the present Vedic experimental study, it may be concluded that different bio-enhancers such as Panchagavya, Beejamrut, Jeevamrut and cow urine significantly influenced vegetative parameters of the crop. Among all treatments, foliar application of Panchagavya @ 4% was found most effective in improving vegetative growth. However, jeevamrut 8 % treatment shows more prominent effect to enhance root length and stem diameter. Other bio-enhancers like jeevamrut, beejamrut, and cow urine also showed positive effects on vegetative parameters compared to control under western Uttar Pradesh conditions.

Table 1: Effect of foliar application of bio-enhancers on the growth parameters of brinjal (*Solanum melongena* L.) cv. Pusa Purple Long.

Not.	Treatments	Plant height 40 DAT		Pooled data	Plant height 60 DAT		d data	Plant height harvesting		d data
		2021-22	2022-23		2021-22	2022-23		2021-22	2022-23	
T_1	Control	36.55	36.03	36.29	56.37	53.95	55.16	63.81	61.44	62.63
T_2	Panchagavya 2%	41.89	40.96	41.43	67.15	65.15	66.15	84.44	83.23	83.84
T_3	Panchagavya 4%	43.60	42.94	43.27	71.10	70.07	70.59	86.65	85.96	86.31
T_4	Panchagavya 6%	41.62	40.81	41.22	67.11	66.08	66.60	83.82	81.95	82.89
T_5	Panchagavya 8%	41.02	40.56	40.79	67.00	65.93	66.47	82.48	81.69	82.09
T_6	Beejamrut 2%	39.11	38.81	38.96	59.96	58.68	59.33	67.23	66.11	66.67

T_7	Beejamrut 4%	38.68	38.40	38.54	58.80	57.71	58.26	65.99	64.54	65.27
T_8	Beejamrut 6%	38.48	38.23	38.35	57.96	56.66	57.32	65.59	64.19	64.89
T_9	Beejamrut 8%	38.16	37.85	38.00	57.54	55.77	56.66	65.17	63.89	64.54
T_{10}	Jeevamrut 2%	41.70	40.67	41.19	67.47	66.10	66.79	82.01	80.64	81.33
T_{11}	Jeevamrut 4%	41.85	40.78	41.31	68.26	67.11	67.69	83.33	82.00	82.67
T_{12}	Jeevamrut 6%	41.95	40.92	41.44	68.83	68.14	68.49	83.66	82.26	82.96
T_{13}	Jeevamrut 8%	42.04	41.70	41.87	70.02	69.73	69.88	86.36	85.30	85.83
T_{14}	Cow urine 10%	41.32	40.09	40.70	63.04	62.11	62.58	74.69	73.73	74.21
T_{15}	Cow urine 20%	40.20	39.12	39.66	60.49	59.84	60.17	69.99	68.96	69.48
T_{16}	Cow urine 30%	39.08	38.63	38.86	60.07	58.85	59.47	68.06	67.42	67.74
T_{17}	Cow urine 40%	38.25	38.29	38.27	59.60	58.34	58.97	66.67	64.93	65.81
	CD at 5%	1.32	1.05		1.64	1.56		1.76	1.66	
	SE (±)	0.46	0.36		0.56	.54		0.61	0.57	

Table 2 : Effect of foliar application of bio-enhancers on the growth parameters of brinjal (*Solanum melongena* L.) cv. Pusa Purple Long.

Not.	Treatments	Number of leaves at 40 DAT		Pool data	Number of leaves at 40 DAT		Pool data	Number of leaves at harvesting		Pool data
		2021-22	2022-23		2021-22	2022-23		2021-22	2022-23	
T_1	Control	22.38	22.18	22.28	58.81	57.40	58.11	71.94	67.82	69.88
T_2	Panchagavya 2%	26.00	25.22	25.62	73.21	72.60	72.91	92.85	91.64	92.25
T_3	Panchagavya 4%	27.09	26.73	26.92	75.59	74.88	75.24	95.92	93.52	94.72
T_4	Panchagavya 6%	25.29	24.87	25.08	73.06	72.47	72.77	92.34	91.19	91.76
T_5	Panchagavya 8%	24.99	24.06	24.53	72.55	72.15	72.35	91.27	88.22	89.75
T_6	Beejamrut 2%	23.82	23.50	23.66	62.70	62.54	62.62	82.34	72.32	77.33
T_7	Beejamrut 4%	23.55	23.43	23.49	62.51	62.38	62.45	81.03	72.06	76.55
T_8	Beejamrut 6%	23.53	23.41	23.47	62.31	62.16	62.24	79.76	70.78	75.27
T_9	Beejamrut 8%	23.40	23.32	23.37	62.20	61.87	62.04	78.24	70.59	74.42
T_{10}	Jeevamrut 2%	23.95	23.68	23.82	72.84	71.94	72.40	91.27	90.36	90.81
T_{11}	Jeevamrut 4%	25.07	24.92	25.00	73.42	72.40	72.91	93.10	91.69	92.39
T_{12}	Jeevamrut 6%	25.88	25.36	25.62	74.59	73.40	74.00	94.28	92.40	93.34
T_{13}	Jeevamrut 8%	26.63	26.22	26.43	75.04	74.59	74.82	95.04	93.37	94.21
T_{14}	Cow urine 10%	24.48	24.39	24.44	69.92	68.78	69.35	86.05	82.41	84.23
T_{15}	Cow urine 20%	24.44	24.30	24.37	68.33	67.90	68.12	80.85	79.91	80.38
T_{16}	Cow urine 30%	24.39	24.12	24.26	67.21	66.66	66.94	79.10	78.46	78.78
T_{17}	Cow urine 40%	23.92	23.66	23.79	64.92	63.81	64.37	77.68	75.24	76.46
	CD at 5%	0.96	0.85		1.48	1.73		1.59	1.51	
	SE (±)	0.33	0.29		0.51	0.59		0.55	0.52	

Table 3: Effect of foliar application of bio-enhancers on the growth parameters of brinjal (*Solanum melongena* L.) cv. Pusa Purple Long.

Not.	Treatments	Number of branches at 40 DAT		Pooled data	Number of branches at 60 DAT		Pooled data	Number of branches at harvesting		Pooled data
		2021-22	2022-23		2021-22	2022-23		2021-22	2022-23	
T_1	Control	2.18	2.16	2.17	3.38	3.36	3.38	4.91	4.89	4.90
T_2	Panchagavya 2%	2.66	2.59	2.62	3.88	3.78	3.83	5.50	5.44	5.47
T_3	Panchagavya 4%	2.91	2.89	2.90	4.15	4.08	4.12	6.11	6.05	6.08
T_4	Panchagavya 6%	2.61	2.53	2.57	3.83	3.72	3.78	5.65	5.55	5.60
T_5	Panchagavya 8%	2.59	2.45	2.52	3.81	3.64	3.73	5.33	5.38	5.36
T_6	Beejamrut 2%	2.39	2.36	2.37	3.61	3.55	3.58	5.22	5.20	5.22
T_7	Beejamrut 4%	2.40	2.30	2.35	3.62	3.49	3.56	5.21	5.19	5.20
T_8	Beejamrut 6%	2.37	2.28	2.32	3.59	3.47	3.53	5.20	5.18	5.19
T_9	Beejamrut 8%	2.28	2.27	2.28	3.50	3.46	3.49	5.18	5.17	5.18
T_{10}	Jeevamrut 2%	2.64	2.62	2.63	3.86	3.81	3.84	5.43	5.36	5.40
T_{11}	Jeevamrut 4%	2.72	2.70	2.71	3.94	3.89	3.92	5.56	5.50	5.53
T_{12}	Jeevamrut 6%	2.84	2.81	2.82	4.05	4.00	4.03	5.92	5.84	5.88

T_{13}	Jeevamrut 8%	2.87	2.83	2.85	4.09	4.02	4.06	6.01	5.99	6.00
T_{14}	Cow urine 10%	2.58	2.57	2.57	3.80	3.76	3.78	5.38	5.34	5.37
T_{15}	Cow urine 20%	2.54	2.52	2.53	3.76	3.71	3.74	5.35	5.28	5.32
T_{16}	Cow urine 30%	2.52	2.51	2.51	3.74	3.70	3.72	5.25	5.26	5.26
T_{17}	Cow urine 40%	2.50	2.49	2.49	3.72	3.68	3.70	5.22	5.19	5.21
	CD at 5%	0.18	0.17		0.18	0.18		0.19	0.23	
	SE (±)	0.06	0.06		0.06	0.06		0.06	0.08	

Table 4: Effect of foliar application of bio-enhancers on the growth parameters of brinjal (*Solanum melongena* L.) cv. Pusa Purple Long.

Not.	Treatments	Fresh weight of plant (g)		Pooled data	Dry weight of plant (g)		Pooled data	Stem diameter (cm)		Pooled data	Root length (cm)		Pooled data
		2021-22	2022-23		2021-22	2022-23		2021-22	2022-23		2021-22	2022-23	
T_1	Control	800.17	726.89	763.53	136.03	123.57	129.80	1.36	1.29	1.33	43.98	42.22	43.10
T_2	Panchagavya 2%	1,026.33	978.33	1002.33	174.47	166.31	170.39	1.65	1.65	1.65	54.23	52.87	53.55
T_3	Panchagavya 4%	1,089.05	1,007.67	1048.36	185.13	171.30	178.22	1.81	1.71	1.77	57.08	55.83	56.46
T_4	Panchagavya 6%	1,018.37	971.66	995.02	173.12	165.18	169.15	1.63	1.61	1.63	53.36	52.65	53.01
T_5	Panchagavya 8%	940.33	846.66	893.50	159.85	143.93	151.89	1.62	1.60	1.62	52.32	51.21	51.77
T_6	Beejamrut 2%	884.36	806.66	845.52	150.34	137.13	143.73	1.57	1.49	1.53	46.30	45.99	46.15
T_7	Beejamrut 4%	856.66	778.66	817.67	145.63	132.37	139.00	1.54	1.47	1.51	46.43	45.84	46.14
T_8	Beejamrut 6%	841.33	763.00	802.17	143.02	129.71	136.36	1.52	1.45	1.49	46.70	45.38	46.05
T_9	Beejamrut 8%	827.20	760.00	793.60	140.62	129.20	134.91	1.47	1.43	1.45	45.90	45.29	45.60
T_{10}	Jeevamrut 2%	988.33	902.66	945.50	168.01	153.45	160.73	1.65	1.62	1.64	52.20	51.49	51.85
T_{11}	Jeevamrut 4%	1,022.33	944.00	983.17	173.79	160.48	167.13	1.70	1.65	1.68	53.01	51.99	52.50
T_{12}	Jeevamrut 6%	1,052.33	974.00	1013.17	178.89	165.58	172.23	1.76	1.67	1.72	55.61	54.34	54.98
T_{13}	Jeevamrut 8%	1,072.03	998.04	1035.04	182.24	169.70	175.97	1.88	1.81	1.85	57.92	56.04	56.98
T_{14}	Cow urine 10%	1,024.33	929.66	977.00	174.13	158.04	166.09	1.62	1.58	1.60	50.44	48.23	49.34
T_{15}	Cow urine 20%	991.66	915.00	953.33	168.58	155.55	162.06	1.52	1.56	1.55	48.58	48.01	48.30
T_{16}	Cow urine 30%	860.33	783.66	822.00	146.25	133.22	139.74	1.50	1.44	1.48	47.98	47.51	47.75
T_{17}	Cow urine 40%	847.15	768.81	807.98	144.01	130.69	137.35	1.45	1.43	1.45	47.78	47.06	47.42
	CD at 5%	17.04	10.58		2.90	1.79		0.14	0.169		1.94	1.26	
	SE (±)	5.89	3.65		1.00	0.62		0.051	0.058		0.67	0.43	

Table 5 : Effect of foliar application of bio-enhancers on the growth parameters of brinjal (*Solanum melongena* L.) cv. Pusa Purple Long.

Not.	Treatments	Leaf length (cm)		Pooled data	Leaf width (cm)		Pooled data	Yield q/ha		Pooled data
		2021-22	2022-23		2021-22	2022-23		2021-22	2022-23	
T_1	Control	10.09	9.72	9.90	4.94	4.84	4.89	214.82	214.68	214.75
T_2	Panchagavya 2%	12.78	11.82	12.30	6.16	6.12	6.14	276.30	276.67	276.49
T_3	Panchagavya 4%	14.17	12.93	13.55	6.79	6.66	6.73	296.43	306.25	301.34
T_4	Panchagavya 6%	12.55	11.75	12.15	6.03	5.88	5.96	275.79	275.90	275.85
T_5	Panchagavya 8%	12.48	11.71	12.10	5.91	5.70	5.81	275.40	275.72	275.56
T_6	Beejamrut 2%	11.29	10.58	10.94	6.09	5.62	5.85	245.39	245.56	245.48
T_7	Beejamrut 4%	11.34	10.52	10.93	5.80	5.58	5.69	245.29	245.40	245.35
T_8	Beejamrut 6%	11.11	10.35	10.73	5.72	5.52	5.62	245.16	245.21	245.19
T_9	Beejamrut 8%	10.80	10.31	10.56	5.39	5.25	5.32	245.10	245.19	245.15
T_{10}	Jeevamrut 2%	12.74	11.77	12.26	6.08	5.59	5.84	248.26	276.35	262.31
T_{11}	Jeevamrut 4%	12.78	11.82	12.30	6.21	6.07	6.14	276.34	276.67	276.51
T_{12}	Jeevamrut 6%	13.26	12.38	12.82	6.21	6.12	6.17	276.49	276.78	276.64
T_{13}	Jeevamrut 8%	14.08	12.72	13.40	6.67	6.34	6.51	286.97	305.81	296.39
T_{14}	Cow urine 10%	12.21	11.30	11.76	6.10	5.92	6.01	245.84	245.87	245.85
T_{15}	Cow urine 20%	11.43	10.98	11.21	5.96	5.91	5.94	245.33	245.38	245.36
T_{16}	Cow urine 30%	11.31	10.70	11.01	5.88	5.85	5.87	245.28	245.32	245.30
T_{17}	Cow urine 40%	11.00	10.43	10.72	5.83	5.78	5.81	245.13	245.20	245.16
	CD at 5%	0.99	0.92		0.41	0.29		9.20	11.66	
	SE (±)	0.34	0.32		0.14	0.10		3.18	4.03	

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