

Effect of different sources of farm yard manure, Jeevamrutha and panchgavya on growth and yield of French bean (*Phaseolus vulgaris* L) var. Paulista

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Received January 2025; Revised Accepted: May 2025

ABSTRACT

A field experiment was conducted at Agricultural Research Farm, AISECT University, Hazaribag, Jharkhand during 2024 to study the combined effect of FYM and liquid manures (Jeevamruth and Panchgavya) on growth and yield of French bean. The experiment was laid out in Randomized Block Design (RBD) with twelve treatments and control which were replicated thrice. Application of FYM in term of 100%, 150% and 200% N and soil application of Jeevamrutha (3%, 5% and 7% or 1000lt/ hect.) and foliar spray of Panchgavya (3%, 5% and 7%) recorded viz. no of seed emergence per plot (%), No of primary branches, plant height (cm), pod length (cm), number of pods per plant, pod weight per plant (gm) and green pod yield (q/hect). The experiment of liquid organic matter such as FYM, Jeevamrutha and Panchgavya leads to an increase in the number of beneficial micro-organism activity of the soil and increased of yield were significantly higher compared to the other treatments .

Key words: Organic farming, FYM, panchgavya, jeevamrutha, french bean

INTRODUCTION

French bean is an important vegetable crop belonging to family Fabaceae. It is one of the most popular and widely grown vegetable crops in India. It is also known as snap bean, bush bean, kidney bean or string bean. French bean is an excellent vegetable crop for pods as well as for seed and its worldwide significance for direct human consumption and a dietary supplement rich in proteins, vitamins and minerals such as calcium, phosphorus, iron and zinc (Broughton *et al.*, 2003). Green pods are an important source of vitamin A which is effective in controlling night blindness in human being (Birajdar, 2006). Organic agricul-

ture is a holistic food production management system, which promotes and ensures biodiversity, biological cycles and biological activity by giving preference to the use of on farm inputs, which are highly adapted to the production system. Due to irrational and non-judicious use of synthetic chemical fertilizers without applying organic manures in the crop production process over the years has led to deterioration of multi-nutrient deficiencies particularly various micronutrients viz. Zn, B, Mn, Fe, Mo etc., which have made the soils less responsive to application of nutrients. Addition of organic matter as source of nutrients is crucial to sustain soil health in long term basis and thus, organic farming plays a pivotal role in agricultural system in the country. Panchgavya and Jeevamrutha are eco-friendly organic preparations made from cow products. The products

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from cow have the ability to bring the flow of cosmic energy which in turn can revitalize the growth process (Sundararaman *et al.*, 2001 and Natarajan, 2002).

The Ayurveda, the ancient Indian system of medicine, has detail mentions of importance of cow's milk, curd, *ghee*, urine in the treatment of various human ailments. Every product has distinct qualities and uses in health, agriculture and other fields (Chauhan, 2005; Achliya *et al.*, 2004; Saxena *et al.*, 2004). Use of farm yard manure and organic liquid formulations like Panchagavya, cow urine and Jeevamrutha are potential source of organic nutrients. Hence, the present experiment was conducted to study the combined effect of FYM, Panchagavya and Jeevamrutha on growth and yield of French bean.

MATERIALS AND METHODS

A field experiment was conducted at Agriculture Research Farm, AISECT University Hazaribag (Jharkhand) during Rabi season 2024 to study the combined effect of Farm Yard Manure (FYM), Jeevamruth and Panchagavya on growth and yield of French bean variety - Paulista. The used of FYM, Panchagavya and Jeevamrutha at different doses in French bean crop. The manually sowing of crop at a spacing of 10 cm plant to plant and 40 cm row to row using seed rate around 25Kg/ hectare. The experiment was laid out in Randomized Block Design (RBD) with ten treatments including control which were three replicated thrice in Rabi 2024. Treatment combinations included three FYM levels (100%, 150% and 200% N equivalent and incorporated three weeks prior to sowing in the soil), three Jeevamrutha level of doses (0 and 1000 litres / ha or 3%, 5% and 7%) and three panchagavya level of doses (3%, 5% and 7%). After that the sown of seeds were used to grow under applied of field conditions.

Mechanism of action of panchgavya

The panchgavya solution will be prepared by thorough mixing of fresh cow dung (7 kg), cow-ghee (1.0 kg), fresh cow urine (10 lit), cow milk (3 lit), cow curd (2 lit), jaggery (3.0 kg). On the first day, 7 kg of cow dung will be thoroughly mixed with 1 kg of cow ghee and kept for 72 hours, fol-

lowed by the addition of 10 lit of cow urine and 10 lit of water. The mixture was stirred twice a day and allowed to ferment for 15 days. On the 19th day, 3 lit cow milk, 2 lit cow curd, 3 kg jaggery, 2 kg banana and 3 lit tender coconut water will be added in the mixture and allowed to ferment for 7 days while stirring twice a day. The stock solution of panchgavya is ready for use after a period of 25 days (Singh, R.R. *et al.*, 2024).

Mechanism of action of Jeevamruth

The Jeevamrutha was prepared by mixing 10 kg of cow dung, 10 litre of cow urine, 2 kg of jaggery, 2 kg of chickpea flour and hand full of soil collected from farm. All these were put in 200 litre plastic drum and mixed thoroughly and volume was made up to 200 litre by adding water. The mixture was stirred well in clock wise direction thrice a day and plastic drum was kept in shade covered with wet jute bag. Jeevamrutha fermented for 10 days was applied to base of the plants manually at 15, 30 and 45 days after sowing (DAS) as per treatments. Observation on plant growth, yield attributes and yield were recorded procedure. Since this Organic fertilizer helps in increasing the activity of beneficial microorganisms including earthworms, this can be used for all types of crops (Greenkosh, 2017). According to Palekar, there is a saying that after continuous use of Jeevamrit for three years, the soil itself becomes full of the micro nutrients required for the plant (Prasada, 2016).

RESULTS AND DISCUSSIONS

The analysis of variance in French bean highly significant of different among the various organic treatments (FYM, Jeevamrutha and panchagavya) for all the parameters number of seed emergence per plot (%), No of primary branches per plant, plant height (cm), pod length (cm), number of pod per plant, pod weight per plant (gm) and green pod yield (Q/hect) at 5% probability level (Table 1).

Mean performance of various Organic Techniques of different treatments

Application of varied level of FYM, Jeevamruths and panchgavaya influenced the growth and yield parameters of French bean

(Table 2) under following mean performance characters as given herein:

No. of seed emergence per plot (%): the minimum no of seed emergence per plot (%) was depicted by treatment T0 (control) 82%, while maximum seed emergence per plot (%) was recorded in treatment T9P3 (Panchagavya -7%) 91.00 followed by T6J3 (Jeevamrutha -7%) 89.00% and T3F3 (FYM-200% N) (88.00%) was significantly higher than other significant treatments. Panchagavya and Jeevamrutha are a powerful plant growth stimulant that increases the biological productivity of plants. It is used to revitalize the soil, protect crops from disease and improve the nutritional value of fruits and vegetables. The increase in growth and yield of these treatments may be due to the fact that FYM besides supplying N, P and K also improved the soil condition which enhanced the source to sink relationship

and also make unavailable sources of elemental nitrogen, bound phosphates, micronutrients and decomposed plant residues into an available form to facilitate the plants to absorb the nutrients (Yadav *et al.* 2013). These results are in agreement with finding of the Guriqbal Singh *et al.* (2012) in chickpea and Siddappa (2015) in field bean.

No. of primary branches per plant: The minimum no of primary branches per plant was exhibited by treatment T0 (control) 4.00 while, maximum no of primary branches per plant was recorded in treatment T6 J3 (Jeevamrutha -7%) 9.00 followed by T9P3 (Panchagavya- 7%) 8.67 and T3F3 (FYM- 200%) 6.67 were significantly higher than other significant treatments. The cow dung in panchagavya and jeevamrutha act as a media for the growth of beneficial microbes and cow urine provides nitrogen which is essential for crop growth upon fermentation with other ingredients

Table 1. Analysis of variance of 07 characters for 10 French bean treatments.

Sr. No.	Characters	Mean sum of square		
		Repl. (df=2)	Treatments (df=9)	Error (df=18)
1.	No. of Seed Emergence per plot (%)	1.233	19.856*	0.678
2.	No of primary branches	0.633	7.515*	0.670
3.	Plant Height (cm)	4.126	72.439*	13.355
4.	Pod length (cm)	0.622	5.241*	0.283
5.	No of pod per plant	0.633	8.459*	1.115
6.	Pod weight per plant (gm)	10.352	109.327*	2.583
7.	Green pod Yield (Q/hect).	2.454	321.088*	3.074

Indicate significance at (*=5%)

Table 2. Mean performance of influence of different organic amendment treatments in used of FYM, Jeevamrutha and Panchagavya into different characters of French bean variety- Paulista.

Characters Treatment	No of Seed Emergence per Plot (%)	No of primary branches	Plant Height (cm)	Pod length (cm)	No. of Pods per plant	Pod weight per plant (g)	Green pod yield (Q/hect.)
T0 (Control)	82.00	4.00	28.03	5.40	11.67	58.90	105.50
T1F1- FYM-100%	85.33	5.33	36.70	6.87	14.67	61.33	127.27
T2F2- FYM- 150%	86.33	6.33	38.43	7.87	16.00	68.40	132.60
T3F3- FYM-200%	88.00	6.67	40.93	8.13	17.00	73.80	137.00
T4J1 – Jeevamrutha 3%	84.33	4.67	32.40	6.80	14.67	71.30	126.93
T5J2- Jeevamrutha 5%	86.67	6.00	37.73	7.67	16.00	73.77	134.80
T6J3- Jeevamrutha 7%	89.00	9.00	46.53	9.53	16.67	75.50	138.97
T7P1-Panchagavya 3%	85.00	6.00	35.43	7.63	15.00	68.07	130.57
T8P2- Panchagavya 5%	88.00	7.00	36.80	8.70	16.00	74.33	137.20
T9P3- Panchagavya 7%	91.00	8.67	39.17	9.83	17.67	76.67	142.33
Grand Mean	86.57	6.37	37.22	7.84	15.53	70.21	131.32
S.Em	0.475	0.473	2.110	0.307	0.610	0.928	1.012
CD	1.412	1.404	6.269	0.913	1.811	2.757	3.007
CV	0.951	12.860	9.819	6.788	6.797	2.289	1.335

in panchagavya and jeevamrutha fermented liquid organic manures also contain plant growth promoting substances like IAA, GA (Nileema and Sreenivasa, 2011). These might have stimulated the necessary growth and development in plants leading to better growth in plants leading to better growth and yield of French bean.

Plant height (cm): The minimum plant height was showed by treatment T0 (control) 28.03 cm While maximum plant height were recorded in treatment T6J3 (Jeevamrutha-7%) 46.53cm and T9P3 (Panchagavya -7%) 39.17cm was significantly higher than other significant treatments. The biochemical properties of panchagavya include almost nutrients such as N, P and K as well as micronutrients and growth hormones necessary for plant growth such as IAA and GA (Selvaraj, J. *et al.* 2003).

Pod length (cm): The minimum pod length was exhibited by treatment T0 (control) 5.40 cm while maximum pod length were recorded in treatment T9P3 (panchagavya-7%) 9.80cm followed by T6J3 (Jeevamrutha-7%) 9.53cm, T8P2 (panchagavya-5%) 8.70 cm and T3F3 (FYM-200%) 8.13cm was significantly higher than other significant treatments.

No. of pods per plant: The lowest no of pods per plant was showed by treatment T0 (control) 11.67 while maximum no of pods per plant was recorded in treatment T9P3 (panchagavya -7%) 17.67 followed by T3F3 (FYM-200%) 17.00 and T6J3 (Jeevamrutha - 7%) 16.67 was significantly higher than other significant treatments. The fast cell proliferation and elongation that panchagavya may have favored due to the presence of growth enzymes.

Pod weight per plant (gm): The minimum pod weight per plant (gm) was exhibited by treatment T0 (control) 58.90 gm, while maximum treatment was recorded in treatment T9P3 (panchagavya-7%) 76.67gm followed by T6J3 (Jeevamrutha-7%) 75.50gm, T8P2 (Panchgavya-5%) 74.33gm and T3F3 (FYM-200%) 73.80gm was significantly higher than other significant treatments. The might have enhanced the decomposition process in the soil which might have resulted in relatively quick release of nutrients from FYM composed to the treatment where jeevamrutha and panchagavya was applied. These results are

in consonance with findings of Basavaraj Kumbar (2016) in French bean.

Green pod yield (Q/hect.): The data of minimum green pod yield (Q/hect) was showed by treatment T0 (control) 105.50q/hect., while maximum green pod yield was recorded in treatment T9P3 (panchagavya-7%) 142.33 followed by T6J3 (Jeevamrutha-7%) 138.97, T8P2 (Panchagavya-5%) 137.20 and T3F3 (FYM-200%) 137.00 was significantly higher than other significant treatments. Green pod yield did not differ significantly due to the interaction between various organic manures with liquid levels of jeevamrutha and panchagavya application. More over in panchagavya when used as foliar sprays IAA and GA may have stimulated the plant system to increase the synthesis of growth regulators in the cell system and promote substantial growth and development. Both Kumar *et al.* (2011) and Bala Kumar *et al.* (2010).

CONCLUSION

The research based recommendations must be developed for suitable organic amendments that provide high yield, grain quality amendments that provide high yields, grain quality and adequate soil fertility during the transition to organic production. The comparison of three sources of organic amendments such as FYM, Jeevamrutha and Panchagavya that there was increases in green pod yield of French bean with different treatments compared with without not used treatment or control of organic amendment farming system. Finding are based on research done in one season in the AISECT University Hazaribag (Jharkhand) further trails may be required for considering it for the recommendation.

ACKNOWLEDGEMENT

Authors are thankful to all faculty members of the Faculty of Agriculture, AISECT University-Hazaribag (Jharkhand) India for their encouragement and support. Thanks are also due to Hon'ble Chairman, AISECT Group of University, Vice Chancellor & Registrar, AISECT University - Hazaribag and Director, CRIG- AGU, providing internal funded with various kinds of necessary help.

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