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EFFECT OF *JEEVAMRUT* ON YIELD AND SOIL PROPERTIES OF CLUSTER BEAN (*CYAMOPSIS TETRAGONOLOBA* L.) CV. PUSA NAVBAHAR

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ABSTRACT

A field experiment entitled "Effect of *Jeevamrut* on yield and soil properties of cluster bean (*Cyamopsis tetragonoloba* L.) cv. Pusa Navbahar" was conducted during the kharif season of 2023 at the College Farm, College of Horticulture, S.D. Agricultural University, Jagudan, Gujarat, India. The experiment was arranged in a randomized block design (RBD) with three replications. Total nine treatments were evaluated in the present study *viz*., control (T_1), *Jeevamrut* spray @ 5% (T_2), *Jeevamrut* spray @ 7.5% (T_3), *Jeevamrut* drenching @ (500 l/ha) (T_4), *Jeevamrut* drenching @ (750 l/ha) (T_5), *Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ (500 l/ha) (T_6), *Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ (750 l/ha) (T_7), *Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ (500 l/ha) (T_8), *Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ (750 l/ha) (T_9). *Jeevamrut* spraying and drenching was done at 20, 40, 60 and 25, 45, 65 DAS, respectively. Based on the discussion thus far, it is concluded that application of *Jeevamrut* spray @ 7.5% at 20, 40 and 60 DAS and *Jeevamrut* drenching @ 750 l/ha at 25, 45 and 65 DAS in kharif cluster bean is advantageous for getting higher yield and net returns.

Keywords: *Jeevamrut,* Drenching and Spraying.

Introduction

According to Craig and Beck (1999), vegetables constitute an integral component of the diets of people all over the world and are necessary for adequate nutrition because they include vital phytonutraceuticals such vitamins, minerals, fiber, and phytochemicals.

About twenty-five different plant families comprise vegetables, some of which are native to India. Growing awareness of the nutritional benefits of vegetables has led to a sharp increase in interest in their cultivation in recent years. Olericulture is becoming more and more important in many nations across the world due to the enormous contribution that vegetable crops make to human nutrition and as a valuable source of income for farmers.

Among the vegetables with the highest protein content, legumes play an important role in Indian gardening. Through a symbiotic association with nitrogen-fixing bacteria, they have the unique capacity to naturally fix atmospheric nitrogen.

Guar (*Cyamopsis tetragonoloba* L.), another name for cluster beans, belongs to the Leguminosae family. Although its precise origin is unknown, *Cyamopsis tetragonoloba* also known as gavar, gawar, or guvar bean is thought to have descended from the African species *Cyamopsis senegalensis*. South Asia is where the plant was domesticated and has been cultivated for generations. The Sanskrit word "gauaahar," which means cow fodder or, more generally, animal feed, is where the name "guar" originates.

Gujarat produces 45.25 thousand metric tons of guar annually from its cultivation on 45.56 thousand hectares of land. Cluster beans are farmed all around the state. About 38,880 metric tons are produced

annually from 3,600 hectares of cultivation in the Mehsana district alone (Anonymous, 2023).

Grown in the summer and kharif seasons, cluster beans are an important vegetable crop that thrives in dry and semi-arid regions. It is an upright annual plant with strong, erect branches that can grow up to two meters in height. The leaves are trifoliate, oval, and serrated, while the stems are angular. Axillary racemes bear its tiny, pink or white blooms. The pods have a single ridge on the ventral side and two ridges on the dorsal side. They are compressed, linear, and grow in clusters. Five to twelve seeds, which can be white, grey, or black in color, are contained in each pod, which is 4 to 10 cm long (Patel *et al*., 2018).

Despite being widely farmed, cluster beans are not extensively grown for commercial purposes. In essence, it is a summer annual legume with deep roots that can withstand drought. With limited cultivation in states like Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Karnataka, and Kerala, the crop is primarily grown in the arid regions of Rajasthan, Haryana, Gujarat, and Punjab (Venkataratnam, 1973).

Commonly eaten as a vegetable, the soft green pods of cluster beans are regarded as a good source of protein, vitamin A, and vitamin C. The nutritional makeup of the edible portion is as follows: 81 g moisture, 10.8 g carbs, 3.2 g protein, 0.4 g fat, 1.4 g minerals, 316 I.U. of vitamin A, 47 I.U. of vitamin C, 0.03 mg riboflavin, and 0.09 mg thiamine per 100 grams, according to Aykroyd (1963). The protein content of the dry seeds is also approximately 33.3%. Additionally, dried green pods are preserved for use as a vegetable later on (Choudhary, 1976).

In addition to their numerous industrial use and cropping system applications, cluster beans also offer dietary and social advantages. Rich in protein, the seed meal a byproduct of the manufacture of guar gum that contains seed coat and germ material is mostly utilized as animal and poultry feed. The industrial applications of cluster beans are the main and most intricate. The primary product used in sectors like textiles, paper manufacturing, adhesives, cosmetics, pharmaceuticals, and food products is galactomannan gum, a naturally occurring, water-soluble polysaccharide polymer that is found in the endosperm (Kumar and Singh, 2002). In folk medicine, *Cyamopsis tetragonoloba* L. is a well-known traditional herb with a variety of therapeutic uses. It treats anorexia and dyspepsia and can be used as a laxative, digestive aid, cooling agent, and appetizer.

According to Mukhtar *et al*. (2006), it also has cytoprotective, antiulcer, antisecretory, hypoglycemic, hypolipidemic, and antihyperglycemic properties.

Jeevamrut provides vital minerals for crop growth and significantly increases soil biological activity. It is made by combining one kilogram of soil, pulse flour, jaggery, cow dung, and urine, and then letting it ferment for a week. Applying the filtered liquid to the soil is thought to improve its microbiology by introducing helpful microbes. Phosphate solubilizers, siderophore makers, and nitrogen-fixing bacteria are reported to be abundant in *Jeevamrut* (Bharadwaj *et al*., 2021).

Until the soil is enriched, *Jeevamrut* is sprayed or sprinkled on crop fields or added to irrigation water at regular intervals of 15 days. Additionally, it encourages nutrient mobilization, use, and nitrogen fixation, all of which increase soil fertility. Growth hormones and trace amounts of macro and micronutrients are also present in *Jeevamrut*, which contributes to increased crop output and growth. A readily available energy source, particularly jaggery, promotes the quick growth of microbes, which during fermentation generate advantageous byproducts including organic acids and antibiotics that are efficient against a range of infections (Patel and Patel, 2017).

Materials and Methods

A field study on cluster bean variety Pusa Navbahar was carried out during the kharif season of 2023 at the College Farm, College of Horticulture, S.D. Agricultural University, Jagudan, Gujarat. The experiment was designed using a Randomized Block Design (RBD) with three replications and comprised a total of nine treatments. The treatments contain control (T_1), *Jeevamrut* spray @ 5% (T_2), *Jeevamrut* spray @ 7.5% (T_3), *Jeevamrut* drenching @ (500 l/ha) (T_4), *Jeevamrut* drenching @ (750 l/ha) (T_5), *Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ (500 l/ha) (T_6), *Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ (750 l/ha) (T_7), *Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ (500 l/ha) (T_8), *Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ (750 l/ha) (T_9). *Jeevamrut* spraying and drenching was done at 20, 40, 60 and 25, 45, 65 DAS, respectively. The experimental soil was loamy sand, with good drainage condition. The FYM 5 t/ha and poultry manure 500 kg/ha were applied. The total number of green pods in each cluster of tagged plant were counted from each treatment and averaged out. The total number of clusters per plant of tagged plant were counted from first picking to the last picking and averaged out. The individual fresh weight of ten randomly selected pods from each tagged plant was

recorded and average was worked out. The total number of pickings from first picking to last picking was counted. The weight of pod was recorded during each picking from five tagged plants from each plot and it was summed the average value per plant was worked out and recorded. The weight of pods harvested at different picking from individual net plot was recorded into kg per plot and it was summed. The weight of all the harvested pods at different picking from individual net plot was summed and converted into quintal per hectare.The fresh weight of the five tagged plants from the individual net plot were recorded after the last harvest. The dry weight of the five tagged plants from the individual net plot were recorded after the last harvest for measuring dry weight of plant (g) the plants were dried in hot air oven at 65°C temperature till constant weight was obtained and weighed on weighing balance and then mean was calculated. Composite soil samples (0-15 cm depth) were taken from 6 to 7 different places from the experimental field before the commencement of the experiment and analyzed for pH, EC (dsm^{-1}), OC (%) and available N, P2O5, K2O (kg/ha) and Microbial count CFU/g using standard procedures.

Results and Discussion

Yield parameters

Number of pods per cluster

The mean data pertaining to number of pods per cluster as affected by different treatments are reported in Table 1.

Statistical analysis revealed a significant effect of the various treatments on this trait during the cropping period. The number of pods per cluster ranged from 7.07 to 8.47, as indicated by the data. However, the maximum number of pods per cluster (8.47) was achieved in the treatment T9 (*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha), followed by treatments T8 (7.87) and T7 (7.80). The minimum number of pods per cluster (7.07) was recorded under the treatment T1 (control).

This could be attributed to the application of *Jeevamrut*, which is associated with enhanced microbial activity and the presence of growth hormones. These factors may have contributed to improved soil biomass and sustained the availability and absorption of both native and applied nutrients, ultimately resulting in increased crop yield in chillies (Sujana *et al*., 2019).

Number of clusters per plant

The data on the number of clusters per plant influenced by various treatments are presented in Table 1. Statistical analysis revealed a significant impact of the treatments on this parameter throughout the cropping period. The number of clusters per plant ranged from 9.53 to 12.53. The highest number of clusters per plant (12.53) was observed in treatment T9 (*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha), which was statistically comparable to treatments T8 (11.67) and T7 (11.53). In contrast, the lowest number of clusters per plant (9.53) was recorded in treatment T1 (control).

The improvement in growth attributes due to the application of *Jeevamrut* may be attributed to enhanced nutrient solubilization in the soil, along with better absorption of nutrients and moisture by cowpea plants (Yogananda *et al*., 2020). Similar findings were also reported by Jidhu Vaishnavi and Jayakumar (2016) in cowpea.

Average pod weight (g)

The data related to average pod weight influenced by various treatments are presented in Table 2. Statistical analysis revealed that the treatments had a significant effect on this parameter during the cropping period. The average pod weight ranged from 1.30 g to 1.63 g. The highest average pod weight (1.63 g) was recorded in treatment T_9 (*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha), which was statistically on par with treatments T_8 (1.54 g) and T_7 (1.50 g). The lowest average pod weight (1.30 g) was observed in treatment T1 (control).

The beneficial effects of IAA, GA3, macro and micronutrients, and the beneficial microorganisms found in the *Jeevamrut* of green grams may be the cause of the increase in pod weight (Somasundaram, 2003).

Number of pickings

Results reported in Table 2 revealed that there was no statistically significant relationship of *Jeevamrut* on number of pickings

Yield per plant (g)

The yield per plant as affected by various treatments are prepared in Table 3.

The statistical analysis demonstrates the significant impact of various treatments during the cropping period on this trait. The treatment T9 (*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha) produced the maximum yield per plant (156.81 g), which was comparable to the treatments T8 (149.47 g) and T7 (145.41 g). Under the conditions of treatment T1 (control) minimum yield per plant (106.14 g) was observed.

The increase in yield and yield characteristics may be the result of inorganic nutrients stimulating root growth and improved water and nutrient absorption from *Jeevamrutha* applied to the soil. This further supports the synergistic and complementary effect of *Jeevamrutha* after fermentation, which favors a higher yield in cowpeas (Sutar *et al*., 2018).

Yield per plot (kg)

Data presented in Table 3 shows the yield per plot (kg) as affected by different treatments.

The statistical comparison demonstrates that different treatments have a significant influence on pod yield per plot during the cropping period.

The treatment T9 (*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha) produced the maximum yield per plot (1.71 kg) which was comparable to the treatments T8 (1.65 kg) and T7 (1.60 kg). The treatment T1 (control) produced the lowest yield per plot (1.25 kg).

Yield per ha (q)

The mean statistics for yield per ha (q), as influenced by various treatments are shown in Table 3.The quantitative study illustrates the significant impact that various treatments had on this attribute during the cropping period. Maximum yield production per hectare (105.76 q) was recorded with treatment T9 (*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha) which was at par with treatments T8 (100.35 q) and T7 (98.57 q). The treatment T1 (control) had the lowest yield per ha (77.31 q).

The total of the different traits that influence growth and yield is the yield. The increase in yield may be the result of organic nutrients stimulating root growth and improved water and nutrient absorption from *Jeevamrutha* applied to the soil. This further supports the synergistic and complementary effect of *Jeevamrutha* after fermentation, which favors a higher yield in cowpeas (Yogananda *et al*., 2020). These results were consistent with those found in cowpea by Sutar *et al*. (2018).

Fresh weight of plant (g)

Results reported in Table 4 revealed that there was no statistically significant relationship of *Jeevamrut* on fresh weight of plant (g).

Dry weight of plant (g)

Results reported in *Table 4* revealed that there was no statistically significant relationship of *Jeevamrut* on dry weight of plant (g).

Soil parameters

EC, pH and organic carbon (%)

Results in Table 5 demonstrated that there was no statistically significant relationship between *Jeevamrut* on EC, pH and organic carbon (%).

Available N, P and K (kg/ha)

Results in Table 6 demonstrated that none of the treatments had any significant impact on soil properties.

Microbial count (CFU/g)

The mean statistics for microbial count (CFU/g), as influenced by various treatments are shown in Table 7. The quantitative study illustrates the significant impact that various treatments had on this attribute during the cropping period. Highest microbial count (171.00 x 10^6 CFU/g) was recorded with treatment T_9 (*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha) which was at par with treatments T_7 (161.00 x 10^6 CFU/g), T8 (156.00 x 10^6 CFU/g) and T_5 (154.67 x 10^6 CFU/g). The treatment T_1 (control) had the lowest microbial count (135.00 x 10^6 CFU/g).

The application of liquid organic manures at various levels may be the cause of the increase in the microbial population since it gives the soil microorganisms more nutrients to grow. In field beans, Devakumar *et al*. (2018). Nutrients can be found in significant quantities in organic liquid formulations. In accordance with the findings of Biradar *et al*. (2017) in French beans, these organic liquid formulations have a direct impact on the soil's microflora, intern N fixation and P solubilization.

Table 1 : Effect of Jeevamrut on number of pods per cluster and number of clusters per plant

Tr. No.	Treatment details	Number of pods per cluster	Number of clusters per plant
T1	Control	7.07	9.53
T2	*Jeevamrut* spray @ 5%	7.13	9.93
T3	*Jeevamrut* spray @ 7.5%	7.27	10.40
T4	*Jeevamrut* drenching @ 500 l/ha	7.40	10.73
T5	*Jeevamrut* drenching @ 750 l/ha	7.47	10.87

T6	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 500 l/ha	7.60	11.00
T7	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 750 l/ha	7.80	11.53
T8	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 500 l/ha	7.87	11.67
T9	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha	8.47	12.53
	S.Em. ±	0.26	0.49
	C.D. at 5 %	0.79	1.48
	C.V. %	6.06	7.85

Table 2 : Effect of *Jeevamrut* on average pod weight and number of pickings

Tr. No.	Treatment details	Average pod weight (g)	Number of pickings
T1	Control	1.30	8.67
T2	*Jeevamrut* spray @ 5%	1.37	9.07
T3	*Jeevamrut* spray @ 7.5%	1.40	9.33
T4	*Jeevamrut* drenching @ 500 l/ha	1.42	9.40
T5	*Jeevamrut* drenching @ 750 l/ha	1.43	9.47
T6	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 500 l/ha	1.46	9.80
T7	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 750 l/ha	1.50	9.87
T8	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 500 l/ha	1.54	10.00
T9	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha	1.63	10.33
	S.Em. ±	0.05	0.32
	C.D. at 5 %	0.15	NS
	C.V. %	5.96	5.74

Table 3 : Effect of *Jeevamrut* on yield per plant (g), yield per plot (kg) and yield per ha (q)

Tr. No.	Treatment details	Yield per plant (g)	Yield per plot (kg)	Yield per ha (q)
T1	Control	106.14	1.25	77.31
T2	*Jeevamrut* spray @ 5%	111.67	1.30	80.41
T3	*Jeevamrut* spray @ 7.5%	127.00	1.34	82.63
T4	*Jeevamrut* drenching @ 500 l/ha	132.12	1.39	85.80
T5	*Jeevamrut* drenching @ 750 l/ha	134.40	1.42	87.67
T6	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 500 l/ha	135.33	1.44	88.68
T7	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 750 l/ha	145.41	1.60	98.57
T8	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 500 l/ha	149.47	1.65	100.35
T9	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha	156.81	1.71	105.76
	S.Em. ±	6.25	0.08	5.16
	C.D. at 5 %	18.74	0.25	15.47
	C.V. %	7.95	9.95	9.95

Table 4 : Effect of *Jeevamrut* on fresh weight of plant (g) and dry weight of plant (g)

Tr. No.	Treatment details	Fresh weight of plant (g)	Dry weight of plant (g)
T1	Control	101.82	40.04
T2	*Jeevamrut* spray @ 5%	108.20	43.91
T3	*Jeevamrut* spray @ 7.5%	112.73	45.50
T4	*Jeevamrut* drenching @ 500 l/ha	113.31	45.87
T5	*Jeevamrut* drenching @ 750 l/ha	114.53	46.21
T6	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 500 l/ha	117.07	46.47
T7	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 750 l/ha	120.30	47.77
T8	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 500 l/ha	123.60	48.09
T9	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha	127.86	55.46
	S.Em. ±	5.15	2.55
	C.D. at 5 %	NS	NS
	C.V. %	7.73	9.49

Table 5 : Effect of *Jeevamrut* on EC, pH and organic carbon (%)

Tr. No.	Treatment details	EC (ds/m)	pH	Organic carbon (%)
T1	Control	0.183	7.663	0.293
T2	*Jeevamrut* spray @ 5%	0.193	7.673	0.297
T3	*Jeevamrut* spray @ 7.5%	0.197	7.683	0.300
T4	*Jeevamrut* drenching @ 500 l/ha	0.200	7.687	0.303
T5	*Jeevamrut* drenching @ 750 l/ha	0.203	7.720	0.303
T6	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 500 l/ha	0.207	7.737	0.307
T7	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 750 l/ha	0.210	7.783	0.307
T8	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 500 l/ha	0.217	7.867	0.310
T9	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha	0.223	7.960	0.317
	S.Em. ±	0.01	0.07	0.01
	C.D. at 5 %	NS	NS	NS
	C.V. %	6.93	1.48	3.59

Table 6 : Effect of *Jeevamrut* on available N, P and K (kg/ha)

Tr. No.	Treatment details	Available N (kg/ha)	Available P (kg/ha)	Available K (kg/ha)
T1	Control	188.15	29.65	265.00
T2	*Jeevamrut* spray @ 5%	192.15	29.74	267.23
T3	*Jeevamrut* spray @ 7.5%	199.68	30.88	267.28
T4	*Jeevamrut* drenching @ 500 l/ha	200.17	31.24	269.22
T5	*Jeevamrut* drenching @ 750 l/ha	200.87	31.65	269.37
T6	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 500 l/ha	204.51	32.36	269.88
T7	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 750 l/ha	204.56	32.75	270.57
T8	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 500 l/ha	207.03	32.99	272.76
T9	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha	214.23	33.84	274.11
	S.Em. ±	4.85	1.11	1.90
	C.D. at 5 %	NS	NS	NS
	C.V. %	4.17	6.06	1.22

Table 7 : Effect of *Jeevamrut* on microbial count (CFU/g)

Tr. No.	Treatment details	Microbial count (x 10^6 CFU/g)
T1	Control	135.00
T2	*Jeevamrut* spray @ 5%	141.00
T3	*Jeevamrut* spray @ 7.5%	143.67
T4	*Jeevamrut* drenching @ 500 l/ha	147.67
T5	*Jeevamrut* drenching @ 750 l/ha	154.67
T6	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 500 l/ha	150.00
T7	*Jeevamrut* spray @ 5% + *Jeevamrut* drenching @ 750 l/ha	161.00
T8	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 500 l/ha	156.00
T9	*Jeevamrut* spray @ 7.5% + *Jeevamrut* drenching @ 750 l/ha	171.00
	S.Em. ±	5.69
	C.D. at 5 %	17.05
	C.V. %	6.52

Conclusions

Based on the discussion so far, it can be concluded that applying a 7.5% *Jeevamrut* spray at 20, 40, and 60 days after sowing (DAS), along with *Jeevamrut* drenching at 750 liters per hectare on the 25th, 45th, and 65th DAS in kharif cluster bean, proves beneficial for achieving higher yields.

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References

Anonymous (2023). Directorate of Horticulture, Gandhinagar, Gujarat.

Aykroyd, W. R. (1963). ICMR special Report. 42.

Bharadwaj, M.; Lakhawat, S. S.; Upadhaya, B.; Shalini, P.; Jain, D. and Bunker, R. N. (2021). Effect of organic liquid manures on vegetative growth and yield of pea (*Pisum sativum* L.). *The Pharma Innovation Journal,* **10**(9): 1360-1364.

Biradar, K. N.; Murali, K.; Devakumar, N. and Lavanya, G. (2017). Influence of organic liquid formulations on soil beneficial microbial population of organic French bean (*Phaseolus vulgaris* L.). Proceedings of the Scientific Conference 'Innovative Research for Organic Agriculture 3.0', New Delhi, India, **9**(11): 467 – 471.

Choudhary, B. (1976). Vegetables (4th edn.), National Book Trust, *Conferences on Sustainable and Self-Sufficient Production of Pulses through on Integrated Approach,* Bengaluru. New Delhi. **105**: 50-58.

Craig, W. and Beck, L. (1999). Phytochemicals: health protective effects. *Canadian Journal of Dietetic Practice and Research,* **60**(2): 78.

Devakumar, N.; Lavanya, G. and Rao, G.G.E. (2018). Influence of *jeevamrutha* and panchagavya on beneficial soil microbial population and yield of organic field bean (*Dolichos lablab* L.). *Mysore journal of agricultural sciences*, **52**(4): 790-795.

Jidhu Vaishnavi, S. and Jeyakumar, P. (2016). Growth and yield response of cowpea to multi location bio-inoculants. *Legume Research*. **39**(6): 962-969.

Kumar, D. and Singh, N. B. (2002). A Book "Guar in India", Scientific Publishers (India), Jodhpur. pp. 1-10.

Mukhtar, H. M.; Ansari, S. H.; Bhat, Z. A. and Naved, T. (2006). Anti hyperglycemic activity of (*Cyamopsis tetragonoloba*) (L.) beans on blood glucose levels in Alloxan-Induced Diabetic Rats. *Pharmaceutical Biology*. **44**(1): 10-13.

Patel, A. J. And Patel, K. G. (2017). Effect of different organic manures on yield and quality of onion (*Allium cepa* L.). *Trends in Biosciences*. **10**(1): 309-311.

Patel, H.; Parmar, V.; Patel, P. and Mavdiya, V. (2018). Effect of organic fertilizers on yield and yield attributes of cluster bean (*Cyamopsis tetragonoloba* L.) cv. Pusa Navbahar. *International Journal of Chemical Studies*. **6**(4): 1797- 1799.

Somasundaram E. (2003). Evaluation of organic sources of nutrients and Panchagavya spray on the growth and productivity of maize sunflower- greengram system; Ph. D. Thesis, Tamil Nadu Agricultural University. Coimbatore.

Sujana, S.; Kohale, V.S.; Gawali, K. A.; Khadse, A. and Nagmote, A. V. (2019). Effect of FYM and organic solutions on yield and quality of chilli (*Capsicum annum* L.). *Journal of Pharmacognosy and Phytochemistry*. **8**(5): 251-254.

Sutar, R.; Sujith, G. M.; and Devakumar, N. (2018). Growth and yield of cowpea [*Vigna unguiculata* (L.) Walp] as influenced by Jeevamrutha and *panchagavya* application. Legume Research – *International Journal*. **42**(6): 824-828.

Venkataratnam, L. (1973). Beans in India, Directorate of Extension, Ministry of Agriculture, New Delhi. p.64.

Yogananda, S. B.; Thimmegouda, P. and Shruthi, G. K. (2020). Performance of cowpea [Vigna unguiculata (L.) Walp] under organic production system in southern dry zone of Karnataka. *An International Journal*. **43**(2): 229-234.