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Influence of Liquid Organic Manure on Growth and Yield of Field Pea

Ghanapuram Tharun Kumar [a++*], Vikram Singh [a#] and Shruti Grace George [a†]

[a] *Department of Agronomy, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj, Uttar Pradesh, India.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

During *Rabi* season 2022 A field trial was laid at Crop Research Farm (CRF), Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), formerly Allahabad Agricultural Institute, Prayagraj (UP) to study the Influence of liquid organic manure on growth and yield of Field pea. The experiment was arranged as nine treatments replicated thrice in Randomized Block Design. The treatment combination of Jeevamrutha (500 l/ha) + Spraying at interval of 7 days observed maximum plant height (97.87 cm), plant dry weight (31.54 g), number of pods/plant (21.97) and number of seeds/pod (4.95) seed yield (2.88 t/ha), and stover yield (4.91 t/ha) of Field pea as related to other treatments. Highest Gross return (INR 167040.00 /ha), Net return (INR 110640.0 /ha) and B: C ratio (1.96) were observed in treatment combination Jeevamrutha (500 l/ha) + Spraying at interval of 7 days as compared to other treatments.

Keywords: Field pea; Panchagavya; Jeevamrutha; schedule of application; growth; yield; economics.

[++] *P.G. Scholar;*
[#] *Associate Professor;*
[†] *Ph.D. Scholar;*
**Corresponding author: E-mail: ghanapuramtharunkumar22@gmail.com;*

1. INTRODUCTION

Field pea (*Pisum sativum* L.) Pulses are an important food crop grown globally as a source of stable protein. Pulses have a wide range of uses as food, feed, and fodder as it provides food for humans, feed and fodder for cattle, in addition to being a less expensive source of protein. Pulses have been known for significant role in preserving and enhancing soil's fertility. Cultivation develops a method to fix atmospheric nitrogen in their root nodules, allowing them to satisfy their nitrogen needs to a large extent. Because of pulse crops fit well into the cropping system. Pulses can withstand drought conditions better than cereal, other crops because of their unique plant types, early maturity, low water and fertilizer requirement and deep-rooted system [1-3].

Field Peas are grown in both developed and developing countries. In developing countries, peas are grown on an industrial scale, while in developing countries, peas are grown incrementally and are considered a staple food. The pea market is very fragmented and demanded peas are sold directly by the producers on the primary or secondary wholesale market. Three main markets were identified: (1) direct food marketing, (2) segmented (branch) marketing, and (3) animal conversion.

It can be eaten alone or mixed with other dishes. Some pea products are frequently preferred by customers. Creamy green and white seeds, thick and heavy. Organic farming is an old tradition that we developed to use fertilizers or natural products found on the farm.

Thus, production costs correspond to chemical products. Organic farming provides nutrients, thus maintaining healthy soil by improving the physical, chemical and biological properties of the soil by cycling. It also guarantees that the environment is safe and the food is non-toxic. Natural resources used in organic agriculture are nutrients, macro and soil environment, which are provided easily and slowly for the microbialpopulation In today's agriculture, liquid fertilizers play an important role in increasing crop yield and reducing the use of fertilizers. Panchagavya, Jeevamrutha, Sanjivak are organic liquids prepared from cow products (such as cow dung, urine, milk, curd, ghee, soybean powder and jaggery) that improve the growth, yield and quality of crops. They contain macronutrients, essential vitamins, essential amino acids, factors such as IAA, GA, and beneficial bacteria [4,5].

In the current organic farming system using FYM and compost as nutrients, soil production decreases during the transition period (until soil fertility returns to good performance), resulting in low yields at the beginning of planting (Natarayan, 2002). The growing concern for environmental safety and the global demand for pesticide-containing foods has led to an interest in growing crops using environmentally friendly materials that are easily biodegradable and do not pose further problems from the storage of toxic substances..

In Sanskrit, panchagavya means a mixture of five products from desi cows, each of these five products is called "Gavya" and together "Panchagavya", it is a mixture of five cow products such as cow dung, cow urine. . , milk and ghee are then fermented by adding banana, jaggery and coconut water in a ratio (5:3:2:2:1) and the final product is called panchgavya. It is an organic product highly recommended for crop improvement in organic farming (Sangeetha and The vanathan, 2010). Panchagavya plays an important role in preventing pests and diseases, thereby increasing the yield of the entire crop [6]. Spray panchgavya is a technique for early flowering, high seed set and low performance of growth and yield enhancing crops.

It is a feature of fertilizers [7]. It is beneficial for crop production and productivity (Somasundaram et al., 2003).

It can be used as foliar spray, soil application and irrigation and seed treatment (Natarajan, 2002). The use of fertilizers and pesticides in agriculture harms the environment, and so do other chemicals. V.N.

Panchagavya act as a growth supporter and immune supporter Maheswari et al. (2017) As all these points in view, the present investigation entitled “Influence of organic liquid manures on growth and yield of Field pea”. Was laid during *Rabi* season of 2022 at Crop Research Farm, Naini Agricultural Institute, SHUATS, Prayagraj, (U.P).

2. MATERIALS AND METHODS

The experiment was conducted during the 2022 Rabbinic season at the Agricultural Research Institute, SHUATS Department of Agronomy,

Prayagraj, India. The soils of the fields that form part of the Ganges alluvium are medium and deep. The soil texture of the experimental area is sandy-loam, the soil chemical reaction (pH7.8) is close to neutral, and the organic carbon level is (0.72%), nitrogen (226 kg/da), phosphorus (39.2 kg/da), potassium (241.7 kg/da), and zinc (2.42 mg/kg) repeated three times. All revisions are compiled and split into 27 plots.The treatment combination is as follows1 Panchagavya + Every 7 Days 2. Panchagavya + Every 14 Days 3. Panchagavya + Every 21 Days 4. Jeevamrutha + Every 7 Days 5. Jeevamrutha + Every 14 Days 6.Jeevamrutha + Every 21 Days 7.Cow urine + Every 7 Days 8.cow urine + Every 14 Days 9.Cow urine + Every 21 Days. Growth parameters and yield were recorded at harvest from randomly selected plants from each plot. The data were calculated and analyzed according to the statistics of Gomez and Gomez (1984).

3. RESULTS AND DISCUSSIONS

3.1 Plant Height (Cm)

100 DAS data were not found to be significant and treatment with Jeevamrutha (500 l/ha) was sprayed every 7 days (6.35), and the maximum number of nodules per plant was recorded. Panchagavya was lower at 2.5% + every 21 days (4.09).

The increase in nodules per plant may be due to the availability of better nutrients through regular use of panchagavya. Foliar sprays of Panchagavya provide micronutrients and increase the formation of plant cell division nodules, ultimately promoting desired growth and development. Similar findings were also reported by Kumaravelu and Kadamban [8].

3.2 Number of Nodules/ Plants

At 60 DAS, treatment with Panchagavya (3%) + spraying every 21 days (26.84) recorded a significant number of nodules per plant. However, Panchagavia (3%) + spraying every 7 days (24.51), Panchagavia (3%) + spraying every 14 days (25.24) and treatment of cow urine (2500 l/ha) + 7 spraying every 14 days (25.01) Statistically Panchagavya (3%) +sprays at 21 day intervals as compared to Nodule increase per plant may be due to better nutrition than daily use of Panchagavya. Leaf spraying of Panchagavya provides micronutrients and improves cell division by plant nodules, ultimately promoting growth and development. Similar findings were also reported by Kumaravelu and Kadamban [9].

3.3 Plant Dry Weight (g/plant)

At 100 DAS, maximum dry plant weight was obtained using Jeevamrutha (500 L/ha) + spraying at 7 day intervals (31.54 g/plant), which is important for all applications. However, cow urine (2500 L/ha) + spray every 7 days (30.48), Jeevamrutha (500 L/ha) + spray every 14 days (29.04) Jeevamrutha (500 L/ha) + spray every 14 days (29.04 L/ha) Comparable Jeevamrutha (500 L/ha) + Spray every 7 days.

The difference between different applications and the amount of have a great influence on the dry peanut yield. Inoculation of panchagavya provides sufficient macronutrients (N, P and K) and micronutrients (Zn, Fe, Cu and Mn) necessary for the overall growth and development of the plant, so the form demand of panchagavya increases the yield of plants. Similar findings were also reported by Kumar et al. [10,11].

3.4 Number of Pods per Plant (No.)

Maximum number of pods per plant was harvested by application of Jeevamrutha (500 l/ha) + spraying every 7 days (21.97). However, Panchagavya (3%) + 7 days (20.62) spraying and Jeevamrutha (500 l/ha) + 21 days (19.44) spraying were given together with jeevamrutha (500 l/ha) + 7 days spraying.

The number of pods/plants may be due to the use of panchagava concentrations in the plant at different times of the system, thus changing the physical and biochemical activities, thus changing the plant anatomy and morphology, thus changing the results of the plant. As reported by Sarah Napa [12].

3.5 Number of Seeds per Pod (No.)

The maximum number of pods per plant was recorded by application of Jeevamrutha (500 l/ha) + spraying every 7 days (4.95). However, applications with Panchagavya (3%) + spray every 7 days (4.65) and Jeevamrutha (500 l/ha) + spray every 14 days (4.25) were statistically significant with Jeevamrutha (500 l/ha) haha. it was significant. ha) + Spray every 7 days. Seed growth per pod will depend on vigorous and fertile vegetative growth leading to a good dispersal of assimilates from the surface to the sink. Similar findings have been reported by Kumawat et al. (2011).

Table 1. Influence of organic liquid manures on growth parameters field pea

Treatment	AT HARVEST		
	Plant height(cm)	Number ofNodules/ Plant	Plant dry weight(g/plant)
Panchagavya (3%) + at an interval of 7 days	90.38	24.51	24.74
Panchagavya (3%) + at an interval of 14 days	85.46	25.24	27.94
Panchagavya (3%) + at an interval of 21 days	83.76	26.84	26.35
Jeevamutha+ at an interval of 7days	91.87	23.11	31.54
Jeevamutha+ at an interval of 14 days	88.82	24.37	29.04
Jeevamutha+ at an interval of 21 days	85.37	23.44	27.72
Cow Urine+ at an interval of 7 days	89.90	20.64	30.48
Cow Urine+ at an interval of 14 days	87.59	25.01	29.84
Cow Urine+ at an interval of 21 days	87.68	22.57	26.76
F test	S	S	S
SEm (±)	0.94	0.79	0.78
CD (p=0.05)	2.83	2.44	2.45

Table 2. Influence of organic liquid manures on yield attributes of Field pea

Treatment	Pods/plant (No.)	Seeds/pod (No.)	Seed Index (g/seeds)	Seed yield (t/ha)	Stover yield (t/ha)	Harvest Index (%)
Panchagavya (3%) + at an interval of 7 days	20.62	4.65	21.78	2.38	3.82	38.39
Panchagavya (3%) + at an interval of 14 days	14.22	2.15	20.5	1.68	3.48	32.56
Panchagavya (3%) + at an interval of 21 days	12.89	2.81	20.83	1.79	3.45	34.16
Jeevamutha+ at an interval of 7days	21.97	4.95	21.46	2.88	4.91	32.65
Jeevamutha+ at an interval of 14 days	15.29	4.25	21.7	1.97	3.7	34.74
Jeevamutha+ at an interval of 21 days	19.44	3.88	21.58	2.01	3.2	38.58
Cow Urine+ at an interval of 7days	18.09	3.48	21.53	1.91	3.56	34.92
Cow Urine+ at an interval of 14 days	16.24	2.55	21.36	1.58	3.37	31.92
Cow Urine+ at an interval of 21 days	15.57	3.35	21.66	1.96	3.78	34.15
F test	S	S	NS	S	S	S
SEm (±)	0.91	0.23	0.65	0.28	0.41	1.18
CD (p=0.05)	2.73	0.70	-	0.86	1.30	3.56

Table 3. Influence of organic liquid manure on economics of Field pea

Treatment combinations	Total cost of cultivation (₹/ha)	Gross returns (₹/ha)	Net returns (₹/ha)	B:C ratio
Panchagavya (3%) + at an interval of 7 days	47,650.00	138040	90,390.00	1.90
Panchagavya (3%) + at an interval of 14 days	43,275.00	97440	54,165.00	1.25
Panchagavya (3%) + at an interval of 21 days	42,025.00	103820	61,795.00	1.47
Jeevamutha+ at an interval of 7days	56,400.00	167040	1,10,640.00	1.96
Jeevamutha+ at an interval of 14 days	47,650.00	114260	66,610.00	1.40
Jeevamutha+ at an interval of 21 days	45,150.00	116580	71,430.00	1.58
Cow Urine+ at an interval of 7 days	65,150.00	110780	45,630.00	0.70
Cow Urine+ at an interval of 14 days	52,025.00	91640	39,615.00	0.76
Cow Urine+ at an interval of 21 days	48,275.00	113680	65,405.00	1.35

3.6 Seed Index (g)

Gene expression data is not important; however, the largest seed size was observed in Panchagavya (3%) + 7-day spraying (21.78 g), while lower seed size was observed in Panchagavya (3%) + 14-day spraying (20.50 g).

The balance of major and minor nutrients can promote cell division, cell wall expansion, meristem activity and photosynthetic activity, making seeds healthy. Similar findings have been reported by Kumawat et al (2011).

3.7 Economics

The outcome showed that high gross return (INR 167040.00 /ha), net return (INR 110640.0 /ha) and benefit cost ratio 1.96) were obsrvered in treatment combination of Jeevamrutha (500 l/ha) + Spraying at interval of 7 days.

4. CONCLUSION

Experimental results show that Jeevamrutha spray is beneficial and effective. Knowledge-based results only, further approval required before approval.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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