



## **Study the Efficacy of Organic Manures on Varieties of Greengram (*Vigna radiata* L.)**

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### **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**

The field experiment was entitled "Study the efficacy of organic manures on varieties of greengram (*Vigna radiata* L.)" was conducted during *Kharif* 2021 at SMOF (SHIATS Model Organic Farm), Department of Agronomy, SHUATS, Prayagraj (U.P). The experiment was laid out in Randomized Block Design consisting of five organic manures including 5 t/ha Farm yard manure, Panchagavya 3%, Jeevamrutha 5%, Panchagavya 5%, Vermiwash 3% in different combinations and three varieties i.e. PDM-139 (Samrat), SML- 668, K-851 was replicated thrice. The result showed that viz: Plant height (59.80 cm), number of branches per plant (6.14), number of root nodules per plant (13.42), dry weight (13.90 g/plant) and crop growth rate at 60 DAS-at harvest interval (3.04 g/m<sup>2</sup>/day) and Number of pods per plant (44.74), seed yield (883.82 kg/ha) and stalk yield (2156.73 kg/ha) was obtained significantly higher with the application of Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM in Samrat variety.

**Keywords:** Panchgavya; jeevamrutha; vermiwash; farm yard manure.

### **1. INTRODUCTION**

India has the largest demand and market for pulses. Although it has great potential to produce

the pulses, but the negligible attention and poor frame working of policy could be the reason for the lower productivity of pulses. Modern agricultural farming practices, along with

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irrational use of chemical inputs over the past four decades have resulted in loss of natural habitat balance and soil health it has also caused many hazards like soil erosion, decreased ground water level, soil salinization and desertification, pollution due to fertilizers and pesticides, genetic erosion, ill-effects on environment, reduced food quality and increased cost of cultivation, rendering the farmer poorer year by year [1]. Realizing the importance of clean food by the people, The demand for organic products, has been increasing especially in developed countries. India has potential to produce range of organic products owing to its agro-climatic variability. In several parts of the country, the inherited tradition of organic farming is an added advantage. This holds promise for the organic producers to tap the market which is growing steadily in the domestic market related to the export market. Pulses are grown especially in rainfed areas with very low use of inorganic nutrients resulting in low productivity in the country. Low application rate of inorganic inputs provides the opportunity for the use of bulky organic manures to grow pulses in the country which will not only increase the yield but also improve the soil health [2-4]. The scope for exploiting direct and residual soil fertility owing to legumes obviously has great potential. Nitrogen substitution with the available resources especially farmyard manure, vermicompost and suitable strains of bio-fertilizers is required for economical and sustained production [5]. Several researches showed that foliar spray of panchagavya @ 3% enhanced the growth rate of plant since it contains the favourable micro and macro-nutrients and growth hormones. The enzyme present in panchagavya favoured rapid cell-division and multiplication resulting in enhanced growth pattern of plants [6] reported that panchagavya spray (3%) at 10 days after sowing (DAS) significantly increased the growth of greengram plants, resulting in higher grain yield. A wide variation was observed that lateral roots, number of nodules, fresh and dry mass of the plants increased significantly at 3% and 4% treatment. Keeping these points in mind the research trail was under taken to assess the efficacy of organic manures on varieties of Greengram.

## 2. MATERIALS AND METHODS

The experiment was conducted during the kharif 2021, at SMOF (SHIATS Model Organic Farm), Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) The

soil of the experimental field constituting a locality of central Gangetic alluvium is neutral and deep. The soil of the experimental plot was sandy loam in texture, low in available nitrogen, medium in available phosphorus and high in available potash with 7.3 soil pH. The treatments accommodates 3 levels of bulky and liquid organic manures with combination of three varieties. The experiment was laid out in randomized block design with nine treatments each replicated thrice. T<sub>1</sub>: Water spray + 5 t/ha FYM + Samrat, T<sub>2</sub>: Panchagavya 3% + Jeevamrutha 5% (30 DAS) + 5 t/ha FYM + Samrat, T<sub>3</sub>: Panchagavya 5% + Vermiwash 3% (30 DAS) + 5 t/ha FYM + Samrat, T<sub>4</sub>: Water spray + 5 t/ha FYM + SML – 668, T<sub>5</sub>: Panchagavya 3% + Jeevamrutha 5% (30 DAS) + 5 t/ha FYM + SML – 668, T<sub>6</sub>: Panchagavya 5% + Vermiwash 3% (30 DAS) + 5 t/ha FYM + SML – 668, T<sub>7</sub>: Water spray + 5 t/ha FYM + K – 851, T<sub>8</sub>: Panchagavya 3% + Jeevamrutha 5% (30 DAS) + 5 t/ha FYM + K – 851, T<sub>9</sub>: Panchagavya 5% + Vermiwash 3% (30 DAS) + 5 t/ha FYM + K – 851. All agronomic practices are followed so as within the crop period. Mean data was analysed statistically, using analysis of variation (ANOVA) as described as by [7].

## 3. RESULTS AND DISCUSSION

### 3.1 Growth Parameters

The experimental data (Table 1) revealed that growth parameters of Greengram were significantly influenced by the treatments. At harvest significantly higher plant height was observed in Samrat with the application of Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM (59.80 cm) which is statistically at par with Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM + Samrat (59.10 cm) and Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM + K – 851 (58.50 cm). Panchagavya increased synthesis of growth promoting substances which is turn helped in increased growth attributes [8]. At harvest significantly higher number of branches per plant is recorded in Samrat with application of Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM (6.14), which is statistically at par with Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM + Samrat (6.05). At harvest the significantly higher number of root nodules per plant is observed in Samrat with application Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM (13.42) which is statistically at par with the application of Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM + Samrat (13.07). At harvest

significantly maximum dry weight was observed in Samrat with application of Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM (13.90 g/plant) and which is superior over all the other treatments. The better plant growth may be due to higher availability of nutrients to plants, besides increased water holding capacity and other physical properties which might have caused increased rate of infiltration. It might be also due to formation of more root nodules, vigorous root development and better nitrogen fixation [9] At 60 DAS – at harvest interval the significantly higher crop growth rate was observed in Samrat with application of Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM (3.04 g/m<sup>2</sup>/day).

### 3.2 Yield Parameters

The pertaining data (Table 2) revealed that significantly higher number of pods per plant was obtained in Samrat with application of Panchagavya 5% + vermiwash 3% + 5 t/ha FYM (44.74) which was statistically at par with the application of Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM + Samrat (44.65). Significantly higher number of seeds per pod was obtained in Samrat with application of Panchagavya 5% + vermiwash 3% + 5 t/ha FYM (10.26). Significantly higher test weight was obtained in SML-668 with application of Panchagavya 5% + Vermiwash 3% (30 DAS) + 5 t/ha FYM (37.63). Significantly higher seed yield was observed in Samrat with application of Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM (883.82 kg/ha) which was statistically at par with Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM + Samrat

(877.19 kg/ha), Water spray + 5 t/ha FYM + K – 851 (871.39 kg/ha), Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM + K – 851 (878.29 kg/ha) and Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM + K – 851 (879.74 kg/ha). The significantly higher stalk yield was observed in Samrat with application Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM (2156.73 kg/ha) which was statistically at par with the application of Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM + Samrat (2140.69 kg/ha) and Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM + SML – 668 (2132.15 kg/ha). The significantly higher harvest index was observed in K-851 with application of Panchagavya 3% + Jeevamrutha 5% + 5 t/ha FYM (31.02 %). This might be attributed due to organic manures that act as nutrient reservoir and upon decomposition produces organic acids, thereby absorbed ions are released slowly during entire growth period leading to higher seed yield and yield components [10]. The above findings are in agreement with [11]. Panchagavya application not only increase the vegetative growth of the plant but it also triggers early flowering, pod formation and uniform grain filling, which leads to get higher grain yield. The positive effect of panchagavya on growth and productivity of crops has been reviewed and documented by [12]. The higher yield attributes characters of plant might be associated with more availability of nutrients under these treatments which resulted in greater translocation of photosynthates from source to sink site. Beneficial effect of organic manures on yield attributes were also observed by [13] and [14].

**Table 1. Influence of organic manures and varieties on growth attributes of greengram**

| Treatment      | Plant height (cm) at harvest | Number of branches/plant at harvest | Root nodules at harvest | Dry weight (g/plant) at harvest | CGR (g/m <sup>2</sup> /day) 60 DAS-at harvest |
|----------------|------------------------------|-------------------------------------|-------------------------|---------------------------------|---|
| T <sub>1</sub> | 57.00                        | 5.98                                | 12.71                   | 11.54                           | 1.70  |
| T <sub>2</sub> | 59.10                        | 6.05                                | 13.07                   | 12.83                           | 2.39  |
| T <sub>3</sub> | 59.80                        | 6.14                                | 13.42                   | 13.90                           | 3.04  |
| T <sub>4</sub> | 55.30                        | 5.88                                | 10.04                   | 11.30                           | 2.05  |
| T <sub>5</sub> | 54.93                        | 6.00                                | 10.34                   | 12.67                           | 2.07  |
| T <sub>6</sub> | 56.60                        | 6.02                                | 10.39                   | 12.47                           | 2.16  |
| T <sub>7</sub> | 56.93                        | 5.91                                | 9.04                    | 10.54                           | 1.98  |
| T <sub>8</sub> | 57.90                        | 5.95                                | 9.26                    | 11.57                           | 2.04  |
| T <sub>9</sub> | 58.50                        | 6.02                                | 9.78                    | 12.70                           | 2.69  |
| F test         | S                            | S                                   | S                       | S                               | NS  |
| SEm (±)        | 0.50                         | 0.03                                | 0.18                    | 0.21                            | 0.38  |
| CD (5%)        | 1.50                         | 0.09                                | 0.55                    | 0.62                            | -   |

**Table 2. Influence of organic manures and varieties on yield attributes of greengram**

| Treatment      | Number of pods/plant | Number of seeds/pod | Test weight (g) | Seed yield (kg/ha) | Stalk yield (kg/ha) | Harvest Index (%) |
|----------------|----------------------|---------------------|-----------------|--------------------|---------------------|-------------------|
| T <sub>1</sub> | 41.50                | 10.01               | 37.13           | 848.23             | 2046.91             | 29.62             |
| T <sub>2</sub> | 44.65                | 10.06               | 37.25           | 877.19             | 2140.69             | 29.06             |
| T <sub>3</sub> | 44.74                | 10.26               | 37.34           | 883.82             | 2156.73             | 29.06             |
| T <sub>4</sub> | 37.42                | 10.03               | 37.25           | 835.74             | 2014.95             | 29.31             |
| T <sub>5</sub> | 38.48                | 10.13               | 37.56           | 844.07             | 2067.01             | 28.99             |
| T <sub>6</sub> | 39.58                | 10.03               | 37.63           | 853.45             | 2132.15             | 28.58             |
| T <sub>7</sub> | 39.48                | 10.08               | 37.29           | 871.39             | 1969.42             | 30.75             |
| T <sub>8</sub> | 41.02                | 10.18               | 37.49           | 878.29             | 1975.38             | 31.02             |
| T <sub>9</sub> | 41.58                | 10.13               | 37.11           | 879.74             | 1983.02             | 30.69             |
| F test         | S                    | NS                  | NS              | S                  | S                   | NS                |
| SEm (±)        | 0.39                 | 0.19                | 0.89            | 4.78               | 13.74               | 1.54              |
| CD (5%)        | 1.17                 | -                   | -               | 14.34              | 41.20               | -                 |

#### 4. CONCLUSION

It is concluded that Samrat variety with application of Panchagavya 5% + Vermiwash 3% + 5 t/ha FYM recorded significantly higher plant height, number of branches, root nodules, dry weight, crop growth rate, more number of pods per plant, seeds per pod, seed yield and stalk yield. These findings are based on one season; therefore, further trails need to be conducted for further confirmation.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

- Suresh Reddy B. Organic farming: Status, issues and prospects – a review. *Agricultural Economics Research Review*. 2010;23:343-358.
- Ghanshyam Dwivedi, Pathak RK, Mishra US. Performance of green gram (Mung) (*Vigna radiata* L.) Varieties to different phosphorus levels. *Journal of Pharmacognosy and Phytochemistry*. 2018;7(6):84-88.
- Sonu Kumar Rai, Avijit Sen, Sant Prasad, Ashutosh Yadav. Study of yield and economics of two different varieties of mung bean (*Vigna radiata* L.) at different NPK level under guava based agri horti system in vindhyan region. *Journal of Pharmacognosy and Phytochemistry*. 2020;9(2):1483-1485.
- Vikram Singh, Sharma SK, Thakral SK, Sharma MK. Effect of Phosphorus on the Performance of greengram (*Vigna radiata* L.) varieties during summer. *Agricultural Research Communication Centre*. 2019; 42(2):247-249.
- Singh AK, Singh SS, Prakash V, Kumar S, Dwivedi SK. Pulses Production in India: Present Status, Bottleneck and Way Forward. *Journal of Agrisearch*. 2015;2 (2):75-83.
- Kumaravelu G, Kadamban D. Panchagavya and its effect on the growth of the greengram cultivar K-85. *International Journal of Plant Sciences*. 2009;4(2):409-414.
- Gomez KA, Gomez AA. *Statistical Procedures for Agricultural Research*. 2<sup>nd</sup> Ed., Wiley and Sons, Inc. New York, USA; 1984.
- Choudhary GL, Sharma SK, Singh KP, Choudhary S, Bazaya BR. Effect of Panchagavya on Growth and Yield of Organic Blackgram [*Vigna mungo* (L.) Hepper]. *International Journal of Current Microbiology Applied Sciences*. 2017;6 (10):1627-1632.
- Shete PG, Thanki JD, Adhav SL, Kushare YM. Response of *rabi* green gram (*Vigna radiata* L.) to land configuration and inorganic fertilizer with and without FYM. *Crop Research*. 2010;39: 43-46.
- Mahesh babu HM, Hunje R, Patil NK, Babalad HB. Effect of organic manures on plant growth, seed yield and quality of soybean. *Karnataka Journal of Agricultural Sciences*. 2008;21(2):219-221.
- Mohabe S, Dotaniya CK, Reagar ML, Dutaniya RK. Effect of organic manures on productivity of greengram [*Phaseolus radiata* (L.)] under rainfed condition. XXI

- Biennial National Symposium of Indian Society of Agronomy. 2018;2018:520-521.
12. Swaminathan C, Swaminathan V, Vijayalakshmi V. Panchagavya Boon to Organic Farming. International Book Distributing Co., India; 2007.
  13. Tripathi AM, Tripathi SK, Mishra P, Singh ON. Effect of INM on growth, yield and uptake of N, P, K of mungbean under rainfed condition. Trends in Biosciences. 2014;7(2):95-97.
  14. Alagappan S, Venkistaswami R. Impact of different sources of organic manures in comparison with RDF and INM on growth and yield of rice-greengram cropping system. The Ecoscan-an International Journal of Environmental Science. 2015;9 (1&2):225-230.

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