The Pharma Innovation Journal 2022; 11(5): 2134-2137

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(5): 2134-2137
© 2022 TPI
www.thepharmajournal.com
Received: 19-02-2022
Accepted: 15-04-2022

Ritu Raj
M.Sc. Scholar, Department of Agronomy, Naini Agricultural Institute, SHUATS, Prayagraj, Uttar Pradesh, India

Biswarup Mehera
Associate Professor, Department of Agronomy, Naini Agricultural Institute, SHUATS, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Ritu Raj
M.Sc. Scholar, Department of Agronomy, Naini Agricultural Institute, SHUATS, Prayagraj, Uttar Pradesh, India

Effect of Vermicompost, Neemcake and Biofertilizers on growth and yield of Green gram (*Vigna radiata* L.)

Ritu Raj and Biswarup Mehera

Abstract
The findings of the present experiment entitled, "Effect of Vermicompost, Neemcake and Biofertilizers on growth and yield of Green gram (*Vigna radiata* L.)", carried out during the *zaid* season of 2021 at the, Department of Agronomy, SHUATS, Prayagraj. The soil of experimental plot was sandy loamy in texture, nearly neutral in soil reaction (pH 7.1), low in organic carbon (0.36%), available N (171.48kg/ha), available P (15.2kg/ha) and available K (232.5kg/ha). The experiment was conducted in Randomized Block Design consisting of 10 treatment combinations with 3 replications and was laid out with the different treatments allocated randomly in each replication. Application of Vermicompost (2.5t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed) recorded maximum plant height (37.51cm), Number of branches per plant (4.43), Number of nodules/plant (20.67), Dry weight (g/plant) (4.59), No. of pods/plant (30.37), Seeds per pod (6.73), Test weight(g) (37.49), Grain yield (1555.00 kg/ha), Stover yield (4009.21 kg/ha), Biological yield (5564.20 kg/ha) and Harvest index (27.95%).

Keywords: Vermicompost, Neemcake and Biofertilizers, Green gram

Introduction
In India, total pulses are grown on 23.46 million ha area with a production of 19.27 million metric tonnes and an average productivity of 789 kg/ha (DES, 2015). Greengram [*Vigna radiata* (L.) Wilczek] commonly known as *Mungbean* and *Goldengram*, is one of the important *kharif* pulse crop. It ranks third among all pulses grown in India after chickpea and pigeonpea. It contains 25 per cent protein. It is quite versatile crop grown for seeds, green manure and forage: as mixed or sole crop either on residual moisture of the previous crop or as a catch crop to make use of the land left fallow between two main season crops. It makes a good manure if incorporated into soil.

One of the important reasons of low productivity is poor fertility of soil. The problem is compounded by the fact that the majority of the farmers in rainfed areas are resource poor with low risk bearing capacity and they generally do not apply recommended dose of fertilizers, either through organic or inorganic sources.

In plant nutrition, organic matter level of a soil is the key property that decides the availability status of essential nutrients. The role of organic materials in maintaining and increasing soil fertility is well established fact to sustain reasonable productivity. The vermicomposting is an eco-friendly and effective way to recycle agricultural and kitchen wastes. Besides these, vermicompost also improves soil aeration, reduction of soil erosion, reduces evaporation losses of water, accelerates process of humification, stimulates the microbial activity, de-odourification of obnoxious smell, destruction of pathogens, detoxification of pollutant in soil etc. (Manna and Biswas, 1996). Neemcake also reduces soil alkalinity by producing organic acid during decomposition. Because it is completely natural, the Neemcake we provide ensures soil fertility. It also improves the organic matter content of the soil, aiding in soil texture, water holding capacity, and soil aeration for better root development. In addition to reducing soil borne pathogens, the addition of Neemcake improved accessible soil organic carbon, N P K, and Mn content, leading in improved mung bean growth and grain output. Neemcake has 5.2 percent nitrogen, 1.0 percent phosphorus, and 1.4 percent potassium. Neemcake reduces nitrification by acting as a nitrogen inhibitor. It keeps available nitrogen in the soil for a long time.

Materials and Methods
The current experiment was conducted at the SMOF (SHUATS Model Organic Farm) during *zaid* season, Department of Agronomy, Naini Agricultural Institute, Sam Higginbottom

University of Agriculture, Technology and Sciences, Prayagraj (Allahabad), (U.P). The SMOF is situated at 25º24‘41.27” N latitude, 81°50‘56” E longitude (Google, 2019) and 98 m altitude above the mean sea level. The experiment was set up in a Randomized Block Design with ten treatments and three replicates to study the effect of different levels of organic manures and biofertilizers T_1: Vermicompost (2.5t/ha) + Rhizobium (20gm/kg seed) T_2: Vermicompost (2.5t/ha) + PSB (20gm/kg seed) T_3: Vermicompost (2.5t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed) T_4:Vermicompost (2.5t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed), T_5: Neem cake (1.25t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed), T_6: Neem cake (1.25t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed), T_7: Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + Rhizobium (20gm/kg seed), T_8: Vermicompost (1.25t/ha) + Neem cake(0.625t/ha) + PSB (20gm/kg seed), T_9: Vermicompost (1.25t/ha) + Neem cake(0.625t/ha) + Rhizobium (10gm/kg seed + PSB (10gm/kg seed) and T_{10}:Control. The cultivated land had a sandy loam soil with virtually neutral pH, had low organic carbon (0.51percent), available N (188 kg/ha), available P (17.80 kg/ha), and available K (245.10 kg/ha). respectively) (Jackson M.L. 1967). Various plant growth metrics were measured at equal intervals from germination through harvest, and several yield characteristics were measured after harvest. Plant Height (cm), Number of branches per Plant, and Dry weight (g/plant) were measured in growth parameters, and yield parameters such as number of pods/plant, number of seeds per pod, Seed yield, stover yield and harvest index (%). were measured and statistically analysed using analysis of variance (ANOVA) Fisher, R.A. and Yates, F. (1963) [2].

Results and Discussion

Effect of Vermicompost, Neemcake and Biofertilizers on growth parameters of Green gram

Plant Height (cm)

At 45 DAS, there was significant difference between the treatments and maximum plant height (37.51) was observed the applications of F Vermicompost (2.5t/ha) + Rhizobium 10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value (26.95) was observed in treatment Control. Similar findings were obtained by Patel *et al.* (2020) [4].

Number of Branches (No.)

At 45 DAS, there was significant difference between the treatments and maximum number of branches plant^{-1} (4.43) was observed the applications of F Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value (2.10) was observed in treatment Control. Similar findings were obtained from Bhavya *et al.* (2018) [1].

Number of Nodules/plant

At 45 DAS, there was significant difference between the treatments and maximum number of nodules/plant (20.67) was observed the applications of F Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value (12.29) was observed in treatment Control. Similar findings were obtained from Sanbharisha *et al.* (2019) [6].

Dry weight (g/plant)

At 45 DAS, there was significant difference between the treatments and maximum dry weight (g) per plant (4.59) was observed the applications of F Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value (2.25) was observed in treatment Control. Similar findings were obtained from Singh *et al.* (2021) and Pathak *et al.* (2021) [7, 5].

Effect of Vermicompost, Neemcake and Biofertilizers on yield attributes of Green gram

Number of pods per plant

The results revealed that there was significant maximum No. of pods per plant (30.37) was recorded in Vermicompost (2.5t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed). Statistically at par data was observed by the application of Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + Rhizobium (20gm/kg seed) having 29.50 pods per plant. Similar findings were obtained from Patel *et al.* (2020) [4].

Number of Seeds per pod

The results revealed that there was significant difference between the treatments and maximum No. of seeds/pod (6.73) was observed by the application of Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed. However, Vermicompost (2.5t/ha) + PSB (20gm/kg seed) (5.47), Vermicompost (2.5t/ha) + Rhizobium (20gm/kg seed) (5.55), and Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + Rhizobium (20gm/kg seed) (5.22) recorded statistically at par value with Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed. Similar findings were obtained from Patel *et al.* (2020) [4].

Test weight (g)

The results revealed that there was significant difference between the treatments and maximum test weight (g) (37.49) was observed by the application of Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value test weight (g) (31.07) was observed in control. However, Vermicompost (2.5t/ha) + PSB (20gm/kg seed) (34.65 g), Vermicompost (2.5t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed) (35.84 g) and Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + Rhizobium (20gm/kg seed) (36.09 g) were statistically at par with Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed. Patel *et al.* (2020) [4].

Grain yield (kg/ha)

The results revealed that there was significant difference between the treatments and maximum Grain yield (kg/ha) (1555.02 kg/ha) was observed by the application of Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value Grain yield (kg/ha) (816.01 kg/ha) was observed in control. Patel *et al.* (2020) [4] Sanbharisha *et al.* (2019) [6].

Stover yield (kg/ha)

The results revealed that there was significant difference between the treatments and maximum Stover yield (4009.20 kg/ha) was observed by the application of Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value Stover yield (3628.19 kg/ha) was observed in control Bhavya *et al.* (2018) [1].

Harvest index (%)

The results revealed that there was significant difference between the treatments and maximum Harvest index (%) (27.95) was observed by the application of Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed, whereas the lowest value Harvest index (%) (18.37) was observed in control. Patel *et al.* (2020) [4].

Conclusion

It is concluded that for obtaining higher yield in Greengram, the treatment combination of Vermicompost (2.5t/ha) + Rhizobium10gm/kg seed + PSB 10gm/kg seed recorded significantly Higher productivity and economics returns.

Table 1: Effect of Vermicompost, Neemcake and Biofertilizers on growth parameters of Green gram

Treatment No.	Treatment Combination		Growth attributes		
		Plant height (cm)	Number of branches	Number of Nodules per plant	Dry weight (g/plant)
1	Vermicompost (2.5t/ha) + Rhizobium (20gm/kg seed)	33.31	3.57	19.03	3.85
2	Vermicompost (2.5t/ha) + PSB (20gm/kg seed)	31.62	3.86	14.47	3.99
3	Vermicompost (2.5t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed)	37.51	4.43	20.67	4.59
4	Neem cake (1.25t/ha) + Rhizobium (20gm/kg seed)	32.40	3.37	17.05	3.79
5	Neem cake (1.25t/ha) + PSB (20gm/kg seed)	33.09	3.98	14.25	3.92
6	Neem cake (1.25t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed)	33.68	3.17	16.52	3.28
7	Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + Rhizobium (20gm/kg seed)	36.27	3.26	16.33	3.34
8	Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + PSB (20gm/kg seed)	34.36	3.66	16.58	3.45
9	Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed)	36.54	3.68	15.26	3.34
10	Control	26.95	2.10	12.29	2.25
	F-Test	S	S	S	S
	S.Em (±)	0.133	0.133	1.065	0.275
	CD (P= 0.05)	0.279	0.279	2.237	0.577

Table 2: Effect of Vermicompost, Neemcake and Biofertilizers on yield attributes of Green gram

Treatment No.	Treatment Combination			Yield and yield attributes			
		No. of pods plant^{-1}	Seeds pod^{-1}	Test weight (g)	Grain yield (kg/ha)	Stover yield (kg/ha)	Harvest Index (%)
1	Vermicompost (2.5t/ha) + Rhizobium (20gm/kg seed)	26.14	5.55	32.68	1433.57	3881.23	26.98
2	Vermicompost (2.5t/ha) + PSB (20gm/kg seed)	24.90	5.47	34.65	1426.85	3741.87	27.61
3	Vermicompost (2.5t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed)	30.37	6.73	37.49	1555.00	4009.21	27.95
4	Neem cake (1.25t/ha) + Rhizobium (20gm/kg seed)	23.06	4.48	33 .17	1405.00	3940.15	26.29
5	Neem cake (1.25t/ha) + PSB (20gm/kg seed)	26.24	5.14	35.84	1408.67	3881.78	26.63
6	Neem cake (1.25t/ha) + Rhizobium (10gm/kg seed) + PSB (10gm/kg seed)	27.37	4.79	33.86	1402.92	3776.61	27.09
7	Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + Rhizobium (20gm/kg seed)	29.50	5.22	36.09	1435.37	3961.04	26.61
8	Vermicompost (1.25t/ha) + Neem cake (0.625t/ha) + PSB (20gm/kg seed)	27.47	4.69	31.67	1407.17	3761.97	27.23
9	Vermicompost (1.25t/ha) + Neem cake (0.625t/ha)	27.06	5.08	32.24	1419.38	3882.48	26.78

	+ Rhizobium (10gm/kg seed) + PSB (10gm/kg seed)						
10	Control	23.08	4.05	31.07	816.00	3628.20	18.37
	F-test	S	S	S	S	S	S
	S.Em (±)	0.95	0.44	1.59	3.90	11.66	0.08
	CD (P= 0.05)	2.83	1.31	3.50	11.57	34.65	0.25

References

1. Bhavya G, Chandra K, Shaker Jayasree G, Malla M Reddy. Effect of Phosphorus, Biofertilizers and Organic Manures on Root Nodulation and Productivity of Green Gram (*Vigna radiata* L.). International Journal of Current Microbiology and Applied Sciences. 2018;7(6):1140-1145.
2. Fisher RA, Yates F. Statistical tables for biological, agricultural and medical research. 1963;22(2):151-158.
3. Jackson M. Soil chemical Analysis. Open Journal of Soil Science. 1967;5(4):498.
4. Patel VM, Shah KA, Nayaka Prabhu. Production Potential of Summer Greengram [*Vigna radiata* (L) wilczek] to Different Nutrient Management Practices under South Gujarat Condition. International Journal of Current Microbiology and Applied Sciences. 2020;9(4):1888-1897.
5. Pathak Sudheer, Srivastava Neha, Lavanya GR. Effect of Plant Growth Regulators, Organic, Inorganic and Biofertilizer on Seed Yield and Vigour Characters in Green Gram (Vigna radiata L. wilczek). International Journal of Current Microbiology and Applied Sciences. 2021;10(01):1947-1951.
6. Sanbharisha Dkhar, Jurisandhya Bordoloi, Bordooloi LJ, Sharma YK. Soil Quality Parameters and Yield of Green Gram as Affected b the Combined Application of Manures and Biofertilizers. International Journal of Current Microbiology and Applied Sciences. 2019;8(4):23-32.
7. Singh Akansha, Sachan AK, Vipin Kumar, Pathak RK, Shubham Srivastav. Effects of Phosphorus with Biofertilizers on Yield and Nutrient Content of Chickpea (Cicer arietinum L.) under Central Uttar Pradesh Condition. International Journal of Current Microbiology and Applied Sciences. 2021;10(02):2228-2234.