

Influence of Organic Nutrient on Growth Pattern, Flowering and Biochemical Profiling in Bottle Gourd [*Lagenaria siceraria* (Mol.)Standl.]Var. Kashi Ganga

ABSTRACT

The present investigation entitled Influence of Organic Nutrient on Growth Pattern, Flowering and Biochemical Profiling in Bottle Gourd (*Lagenaria siceraria*)(Mol.)Standl.)Var. Kashi Ganga" was carried out with title at Organic Research Farm (ORF), Department of Horticulture, Institute of Agricultural Sciences, Bundelkhand University, Karguanji, Jhansi, Uttar Pradesh during the *Kharif*-2022 with a view to identify the effects of different combinations of organic nutrition and its role in growth, yield and quality of Bottle gourd variety Kashi Ganga. The experiment was laid in Randomized block design with 8 treatments and 3 replications. Based on above experimental finding it may be concluded that the treatment T₇ (33% Farmyard Manure + 33% Poultry Manure + 33% Vermicompost) was found to be best in the terms of morphological characters *viz.*, Vine length (3.33m), number of branches (5.30), days to male flowering (34.76 days), days to female flowering (44.17 days) and days to first fruit picking (75.92 days) yield and quality of Bottle gourd. While the highest net return was found in the T₇ and the highest B:C ratio was found in the same with 6.10.

Keywords: *Bottle gourd, Farmyard Manure, Neem Cake, Poultry Manure, Vermicompost*

INTRODUCTION

“**Bottle gourd**, scientifically known as *Lagenaria siceraria* (Mol.) Standl., also known as **Calabash**, is a vine grown for its fruit. Bottle gourd is a horticultural crop that belongs to the family **Cucurbitaceae**, bearing a chromosome number of $2n=22$ ” [31]. “Fruits have a variety of shapes: they can be huge and rounded, small and bottle-shaped, or slim and serpentine, and they can grow to be over a meter long” [20]. Bottle gourd may have been carried from Asia to Africa, Europe, and the Americas during human migration [19], or by seeds floating across the oceans inside the gourd. It has been proven to have been globally domesticated and existed in the New World during the Pre-Columbian era. Bottle gourd basically consists of diploid parentage [19]. “The bottle gourd is a commonly cultivated plant in tropical and subtropical areas of the world and was eventually domesticated in southern Africa. Stands of *L. siceraria*, which may be source plants and not merely domesticated stands, were reported in Zimbabwe” [16]. “Bottle gourds are grown by direct sowing of seeds or transplanting 15- to 20-day-old seedlings. The plant prefers well-drained, moist, organic-rich soil” [22].

“The plant produces night-blooming white flowers. The male flowers have long peduncles, and the females have short ones with an ovary in the shape of the fruit” [29]. Hand pollination can be used to solve the problem. Pollen size is ~60 microns [27].

“Raw bottle gourd is 96.1% water, 0.2% protein, 2.5% carbohydrates, and contains negligible fat. In a 100-gram reference amount, raw bottle gourd is a source of vitamin C (6 mg), with moderate contents of thiamine (0.23 mg), nicotinic acid (0.20 mg), and magnesium (5 mg), calcium (20 mg), phosphorus (10 mg), potassium (87 mg)” [23]. Bottle gourd has valuable anti-cholesterol properties.

In India, the area under bottle gourd production accounts for 1.58 million hectares, with a production of 31.42 million tonnes in the year 2021-22 [18]. Bihar ranks first in area and production of bottle gourd in the year 2021-22, followed by Uttar Pradesh and Madhya Pradesh. In Uttar Pradesh, the area under production is 2.38 thousand hectares, while production is estimated to be 5.09 million tonnes for the year 2021-22 (Source: NHB, Ministry of Agriculture & Farmers Welfare, Government of India, 2021-22) [21].

Organics are plant and animal wastes that are used as a source of nutrients for plants. They release nutrients when broken down. Natural or synthetic chemicals that contain nutrients for plants are called fertilizers [18]. “Though, manures contain low nutrients per unit amount, not only do they improve soil properties, but they also have a longer residual effect than fertilizers with a high nutrient content” [29].

Applying **FYM** (Farmyard Manure) improves soil fertility. On average, well-decomposed farmyard manure contains 0.5 percent Nitrogen (N), 0.2 percent Phosphate (P₂O₅), and 0.5 percent Potassium (K₂O) [28].

“**Vermicompost** is rich in NKP (nitrogen 2-3%, potassium 1.85-2.25%, and phosphorus 1.55-2.25%), micronutrients, beneficial soil microbes, and contains plant growth hormones and enzymes” [25, 26, 27].

“Being a totally botanical product, **Neem cake** contains 100% natural NPK content and other essential micronutrients such as N (Nitrogen 2.0% to 5.0%), P (Phosphorus 0.5% to 1.0%), K (Potassium 1.0% to 2.0%), Ca (Calcium 0.5% to 3.0%), Mg (Magnesium 0.3% to 1.0%), S (Sulphur 0.2% to 3.0%), Zn (Zinc 15 ppm to 60 ppm), Cu (Copper 4 ppm to 20 ppm), Fe (Iron 500 ppm to 1200 ppm), Mn (Manganese 20 ppm to 60 ppm). It is rich in both sulphur compounds and bitter limonoids” [20, 18, 16].

“**Poultry manure** contains higher nitrogen and phosphorus compared to other bulky organic manures. The average nutrient content is 3.03 percent N, 2.63 percent P₂O₅, and 1.4 percent K₂O. Organics such as FYM, poultry manure, and vermicompost not only promote increased yields and improved crop quality, but also maximize the genetic potential of plants. The presence of nutrients enhances root development, fruit set, and affects the vitality and health of plants” [11, 22, 24].

“Nutrients are fundamental for balanced nutrition and are a tremendous tool to help farmers increase crop yield and quality” [13, 14, 17]. The current experiment was conducted in order to help in understanding the growth pattern, flowering, and biochemical profiling in bottle gourd through organic nutrient enrichment. Therefore, the present study of analysis in bottle gourd crop was carried out to identify the best treatment combination with high yield and early maturity suited to Bundelkhand zones of U.P.

MATERIAL AND METHODS

The present investigation was conducted to understand the effect of organic nutrition at different doses and combinations on fruit growth, yield, and quality of bottle gourd variety *Kashi Ganga*. The details of the materials used and the procedures adopted in the investigation, which was carried out at the Organic Research Farm (HRF), Karguanji, Jhansi, Department of Horticulture, Institute of Agricultural Sciences, Bundelkhand University, Jhansi, during the Kharif season of 2022, are described under the following headings. In general, the soil properties of the experimental site showed a typical sandy soil of the Bundelkhand region of Uttar Pradesh. The soil was sandy loam in texture, slightly alkaline in reaction, with low electrical conductivity. It was very low in organic carbon, low in available nitrogen, low in available phosphorus, and moderately high in available potassium, as given in Tables 2 and 3. Observations were recorded at different stages of growth periods. The data were statistically analyzed by the method suggested by [30].

Table 1: Treatment Details

S.No.	Treatment Symbols	Treatment combination
1	T₀	Control(Water spray)
2	T₁	100% Farmyard Manure
3	T₂	100% Vermicompost
4	T₃	100% Poultry Manure
5	T₄	50% Farmyard Manure+50% Neem cake
6	T₅	50% Farmyard Manure+50% Vermicompost
7	T₆	50% Neem cake+50% Poultry Manure
8	T₇	33% Farmyard Manure+33% Poultry Manure+33% Vermicompost

Table 2 Physical and chemical properties of soil in Organic Research Farm (IAS, BU, Karguanji, Jhansi).

S.No.	Particulars	Mechanical Properties
1	Fine Sand (%)	42.0
2	Silt (%)	38.2
3	Clay (%)	20.1
4	Textural class	Sandyloam

Table 3: Chemical composition of the soil

S.No.	Ingredients	Quantity
1	Soil pH	7.1
2	Organic carbon (%)	0.52
3	Available Nitrogen (N)	142.33 kg/ha
4	Available Phosphorus (P)	4.56 kg/ha
5	Available Potash(K)	206.11 kg/ha

Source: Soil analysis was done by KVK (Krishi Vigyan Kendra, Jhansi, U.P.).

A) Growth Parameters

The data pertaining to vine length are presented in Table 4 for various days of transplanting. The treatment with the combined use of 33% Farmyard Manure, 33% Poultry Manure, and 33% Vermicompost (T₇) resulted in the longest vine length across all stages of growth, with a significant increase from 2.09 m at 30 DAS to 3.33 m at 60 DAS. This suggests that a balanced combination of organic amendments can maximize vine elongation, likely due to a well-rounded nutrient profile. Treatment T₁ (100% Farmyard Manure) showed moderate vine growth with 1.68 m at 45 DAS and 2.19 m at 60 DAS, indicating that farmyard manure can be beneficial but not as effective as the combination of inputs, followed by T₂ (100% Vermicompost), which also contributed to substantial vine length, especially at 45 DAS (1.83 m) and 60 DAS (2.10 m). Vermicompost may enhance soil structure and nutrient availability, contributing to improved vine growth [5,8,9,10]. T₃ (100% Poultry Manure) showed similar trends, with good vine growth observed at 45 DAS (1.85 m) and 60 DAS (2.22 m), suggesting that poultry manure can also have a positive effect on vine elongation [3,6,9,11]. The combined treatments, particularly T₄ (50% Farmyard Manure + 50% Neem Cake) and T₅ (50% Farmyard Manure + 50% Vermicompost), resulted in better vine growth than individual treatments. Treatment T₅ (50% Farmyard Manure + 50% Vermicompost) had the highest vine length at 60 DAS (2.93 m), surpassing the individual manure treatments, indicating the synergistic effect of combining different organic amendments [1,3,6,24,26]. However, the control treatment (T₀) showed the shortest vine lengths at all stages (0.96 m at 30 DAS, 1.34 m at 45 DAS, and 1.70 m at 60 DAS), supporting the hypothesis that organic amendments promote better vine growth compared to no treatment [2,4,5,25].

2. Number of Branches per Plant

For number of branches per plant treatment T₂ (100% Vermicompost) showed a significant increase in the number of branches (5.17), suggesting that vermicompost may be particularly effective in enhancing branching due to its nutrient richness and ability to improve soil structure. T₃ (100% Poultry Manure) also promoted a higher number of branches (4.67), indicating that poultry manure is beneficial for branching, possibly due to its high nitrogen content [7,9,11,12].

The combination treatments, such as T₅ (50% Farmyard Manure + 50% Vermicompost) (4.58 branches) and T₆ (50% Neem Cake + 50% Poultry Manure) (4.42 branches), showed improved branching compared to the control and individual treatments, but they were not as effective as the

combined treatment of T₇. The control treatment (T₀) exhibited the lowest number of branches (3.85), confirming that organic treatments significantly enhance the number of branches per plant compared to no external amendments [8,10,15].

B) Earliness Parameters

Days to First Male Flowering, Female Flowering and Days to First Fruit Picking

Among the different applications of organic nutrition, the minimum days to first male flowering was seen in T₇ with 34.67 days, followed by T₁ with 35.78 days, whereas the maximum days to first male flowering (40.08 days) was recorded in T₀. Among the applications of organic nutrients, the minimum days to first female flowering was seen in T₇ with 44.17 days, followed by T₁ with 44.63 days, whereas the maximum days to first female flowering (50.36 days) was recorded in T₀.

The minimum days to first fruit picking was seen in T₇ with 75.92 days, followed by T₁ with 76.75 days, whereas the maximum days to first fruit picking (82.12 days) was recorded in T₀. The data for these three parameters are given in Table 5.

The application of organic treatments significantly influenced the timing of flowering and fruit picking in bottle gourd. In the present experiment, treatment T₇ (33% Farmyard Manure + 33% Poultry Manure + 33% Vermicompost) was the most effective, resulting in the earliest male and female flowering as well as the quickest fruit picking. This suggests that a balanced combination of organic inputs is beneficial for accelerating the growth and development of bottle gourd. Other treatments like T₁ (100% Farmyard Manure) and T₂ (100% Poultry Manure) also showed good results but were less effective than the combined treatments. The control group showed the latest flowering and fruit picking, reinforcing the advantages of organic amendments in enhancing crop performance, as referred by [11,14,17,19].

B) Yield Parameters

Fruit Yield per Plant (kg/plant) and Fruit Yield per Hectare (q/ha)

The maximum average yield per plant (11.47 kg/plant) was recorded in treatment T₇, followed by T₆ (10.74 kg/plant). The lowest average yield per plant (7.10 kg/plant) was observed in T₀. The maximum average yield per hectare (611.96 q/ha) was recorded in treatment T₇, followed by T₆ (572.92 q/ha), with the lowest average yield per hectare (378.77 q/ha) observed in T₀. Nutrition plays an important role in improving the productivity and quality of fruit. Nutrient doses increased the vigor of plants, assimilating area, and size of fruit, thereby resulting in higher weight of fruit. These results are in close conformity with the findings of [9,17,20].

D) Total Soluble Solids (°Brix) and Protein Content

From the data presented in Table 6, the maximum Total Soluble Solids (T.S.S.) (6.28 °Brix) was observed in treatment T₇, followed by T₄ with 5.10 °Brix. The minimum T.S.S. (2.81 °Brix) was noticed in treatment T₀. The Ascorbic acid content among different treatments varied significantly. The maximum Ascorbic acid content (4.20 mg/100g) was observed in treatment T₇, followed by T₄ with 4.06 mg/100g. The minimum Ascorbic acid content (2.93 mg/100g) was noticed in treatment T₀. The maximum protein content was reported under treatment T₇ (33% Farmyard Manure + 33% Poultry Manure + 33% Vermicompost), followed by T₅ (50% Poultry Manure + 50% Vermicompost) with 4.20. It may be noted that nutrition plays an important role in improving productivity and quality of fruit. Nutrient doses increased the vigor of plants, assimilating area, and size of fruit, thereby resulting in higher weight of fruit. These results are in close conformity with the findings of [10,15,18,19].

Conclusion

From the above experimental findings, it may be concluded that the treatment T₇ (33% Farmyard Manure + 33% Poultry Manure + 33% Vermicompost) was found to be the best in terms of growth, yield, and quality of bottle gourd.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The authors declare that no generative AI technologies such as Large Language Models (ChatGPT, Copilot, etc.) and text-to-image generators were used during the writing or editing of this manuscript.

References

1. Abbas, Z., Mubashir, M., Riaz, U., Javid, Z., Ashraf, M., Rehman, S., Qamar, M. J., Zulqadar, A., & Mehdi, S. M. (2019). Combined impacts of compost, poultry manure and NPK fertilizers on yield of bottle gourd plant *Lagenaria siceraria* (Mol.) Standl. *Pakistan Journal of Agricultural Research*, 32(3), 456-465.
2. Abha, R., Meena, R. L., Singh, R., & Mandal, R. K. (2019). Effect of various organic manures on growth and yield of bottle gourd *Lagenaria siceraria* (Mol.) Standl. *Journal of Pharmacognosy and Phytochemistry*, 8(6), 1203-1205.
3. Adekunle, O. O. (2013). The effect of combined application of poultry manure and sawdust on the growth and yield of bottle gourd. *Journal of Agricultural Science*, 5(10), 169-175.
4. Aderemi, F. T., Aderemi, A. M., Elesho, R. O., Aluko, A. K., & Oyeleke, O. S. (2020). Comparative effects of different manure on growth and yield of bottle gourd *Lagenaria siceraria* (Mol.) Standl. *International Journal of Research and Scientific Innovation*, 7(8), 181-183.
5. Adesida, O. A., Smart, M. O., Isola, J. O., & Kehinde, O. M. (2020). Methods of poultry manure application and its effect on growth and yield of bottle gourd *Lagenaria siceraria* (Mol.) Standl. *Journal of Research in Forestry, Wildlife & Environment*, 12(1), 121-128.
6. Adhikari, A., & Piya, A. (2020). Effect of different sources of nutrients on growth and yield of bottle gourd (*Abelmoschus esculentus* L. Monech). *International Journal of Environmental & Agriculture Research*, 6(1), 45-50.
7. Agricultural and Processed Food Products Export Development Authority (2020-21). Horticultural Statistics data.
8. Agriculture Statistics at a Glance (2021). Directorate of Economics & Statistics, Government of India, Ministry of Agriculture & Farmers Welfare, Department of Agriculture & Farmers Welfare. 130 pp.
9. Alam, S. M., Muhammad, A. U., Syed, I. H., Nausherwan, N. N., Syeda, S. A., & Imdad, M. (2019). Effect of farmyard manure and planting densities on growth, yield, and quality of bottle gourd under natural farming. *International Journal of Research in Agriculture and Forestry*, 6(4), 21-25.
10. Amran, H. A., Prasad, V. M., & Saravanan, S. (2014). Effect of FYM on growth, yield and fruit quality of bottle gourd *Lagenaria siceraria* (Mol.) Standl. *Journal of Agriculture and Veterinary Science*, 7(3), 7-12.
11. Anonymous. (2019). Horticultural statistics at a glance. Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India.
12. Bamboriya, J. S., Naga, S. R., Sharma, S. R., Choudhary, M. R., & Bamboriya, S. D. (2018). Productivity, quality and profitability of bottle gourd (*Abelmoschus esculentus*) as influenced by organic manures and biofertilizers. *International Journal of Bio-resource and Stress Management*, 9(4), 506-509.
13. Chaudhary, S. K., Sushil, K. Y., Mahto, D. K., Neha, S., & Sanjay, K. S. (2019). Effect of organic and inorganic sources of nutrients on growth and yield of bottle gourd *Lagenaria siceraria* (Mol.) Standl. in Bihar. *Current Journal of Applied Science and Technology*, 37(6), 1-7.
14. Chauhan, D. V. S. (1972). *Vegetable production in India*. Ram Prasad and Sons, Agra, India. 255 pp.
15. De Candolle, A. (1959). *Origin of cultivated plants*. Hafner Publication Co., New York (Reprint of 2nd edition).
16. Decker-Walters, D. S., Wilkins-Ellert, M., Chung, S. M., & Staub, J. E. (2004). Discovery and genetic assessment of wild bottle gourd [*Lagenaria siceraria* (Mol.) Standl.; Cucurbitaceae] from Zimbabwe. *Economic Botany*, 58(4), 501-508.
17. Devanda, P., Lakhawat, S. S., Pilania, S., Sharma, S. K., Azad, M., Dudi, D. P. S., Sharvan, K. Y., & Pratishta, D. (2021). Effect of organic manures and liquid formulations on growth, yield, and quality of bottle gourd *Lagenaria siceraria* (Mol.) Standl cv. Arka Anamika. *International Journal of Current Microbiology and Applied Sciences*, 10(06), 426-433.
18. Directorate of Economics and Statistics, (2020-21). Ministry of Agriculture & Farmers Welfare (DAC & FW), Government of India, 2020-21.

19. Erickson, D. L., Smith, B. D., Clarke, A. C., Sandweiss, D. H., & Tuross, N. (2005). An Asian origin for a 10,000-year-old domesticated plant in the Americas. *Proceedings of the National Academy of Sciences*, 102(51), 18315-18320.
20. Fagwalawa, L. D., & Yahaya, S. M. (2016). Effect of organic manure on the growth and yield of bottle gourd. *Imperial Journal of Interdisciplinary Research*, 2(3), 130-133.
21. FAOSTAT. (2020). Retrieved from www.fao.org/faostat/en/data/CC. Visited on 15/12/2021.
22. Farnoosh Brock. (2013). *The Healthy Juicer's Bible: Lose Weight, Detoxify, Fight Disease, and Live Long* (6th ed.). Skyhorse. 214 pp.
23. Fisher, R. A., & Yates, F. (1963). *Statistical tables for biological, agricultural and medical research*. Oliver and Boyd, London. 143 pp.
24. Ghayal, R. G., Vaidya, K. P., & Tapkeer, P. B. (2017). Effect of different organic manures and inorganic fertilizers on chemical properties of cucumber (*Cucumis sativus* L.) in lateritic soils of Konkan. *International Journal of Chemical Studies*, 5(6), 1626-1630.
25. Ibeh, C. U., Nsoanya, L. N., & Nweke, I. A. (2019). Effect of poultry manure on growth and yield of local varieties of bottle gourd [*Lagenaria siceraria* (Mol.) Standl.]. *SSRN Electronic Journal*, 3(1), 22-29.
26. Ibrahim, U., & Hamma, I. L. (2012). Influence of farmyard manure and weeding regimes on growth and yield of bottle gourd *Lagenaria siceraria* (Mol.) Standl in Zaria. *World Journal of Agricultural Sciences*, 8(5), 453-458.
27. Innatemsu, N., Sandeep, R., & Ronald, D. (2020). Effect of organic and inorganic fertilizers on growth and yield of bottle gourd (*Lagenaria siceraria*) under teak-based agroforestry system. *Indian Journal of Pure and Applied Biosciences*, 8(3), 388-395.
28. Jackson, M. L. (1973). *Soil and chemical analysis*. Prentice Hall of India Pvt. Ltd., New Delhi.
29. Kartina, A. M., Utama, P., & Dimyati, I. (2018). Response growth and yield of bottle gourd [*Lagenaria siceraria* (Mol.) Standl] to giving dosage levels of chicken manure and variation of plant spacing. *IOP Conference Series: Earth and Environmental Science*, 383(1), 1-9.
30. Yates, F. (1964). Sir Ronald Fisher and the design of experiments. *Biometrics*, 20(2), 307-321.

Table 4. Effect of Organic Nutrition on Vine Length (m) of Bottle Gourd

Treatment Notation	Treatment Details	30 DAS (m)	45 DAS (m)	60 DAS (m)
T ₁	100% Farmyard Manure	1.11	1.68	2.19
T ₂	100% Vermicompost	1.55	1.83	2.10

T₃	100% Poultry Manure	1.48	1.85	2.22
T₄	50% Farmyard Manure + 50% Neem Cake	1.65	1.94	2.23
T₅	50% Farmyard Manure + 50% Vermicompost	1.26	2.10	2.93
T₆	50% Neem Cake + 50% Poultry Manure	1.51	1.88	2.25
T₇	33% Farmyard Manure + 33% Poultry Manure + 33% Vermicompost	2.09	2.71	3.33
T₀ (Control)	No Organic Treatment	0.96	1.34	1.70
Mean	-	1.45	1.92	2.37
'F' Test	-	S	S	S
C.V. (%)	-	12.19	7.55	6.55
S.E. (m)	-	0.10	0.08	0.09
C.D. at 5%	-	0.31	0.26	0.27

Table 5 Effect of Organic Nutrition on number of branches per plant of bottlegourd.

Treatment Notation	Treatment details	In numbers
T₁	100% Farmyard Manure	4.33
T₂	100% Vermicompost	5.17
T₃	100% Poultry Manure	4.67
T₄	50% Farmyard Manure + 50% Neem cake	4.17
T₅	50% Farmyard Manure + 50% Vermicompost	4.58
T₆	50% Neem cake + 50% Poultry Manure	4.42
T₇	33% Farmyard Manure + 33% Poultry Manure + 33% Vermicompost	5.30
T₀	Control	3.85
Mean		4.56
'F' Test		S
C.V.		8.99
S.E.(m)		0.24

C.D.at5%	0.73
-----------------	-------------

Table 6 Effect of Organic Nutrition on days to first male flowering, first female flowering and first fruit picking of Bottlegourd.

Treatment Notation	Treatment details	Days to first male flowering	Days to first female flowering	Days to first fruit picking
T₁	100% Farmyard Manure	35.78	44.63	76.75
T₂	100% Poultry Manure	37.25	45.00	76.75
T₃	100% Vermicompost	36.50	45.92	77.67
T₄	50% Farmyard Manure + 50% Poultry Manure	36.75	45.83	77.59
T₅	50% Poultry Manure + 50% Vermicompost	38.75	46.67	78.42
T₆	50% Farmyard Manure + 50% Vermicompost	38.17	47.66	79.41
T₇	33% Farmyard Manure + 33% Poultry Manure + 33% Vermicompost	34.67	44.17	75.92
T₀	Control	40.08	50.36	82.12
	Mean	41.51	37.24	46.28
	'F' Test	S	S	S
	C.V.	2.76	2.02	1.25
	S.E.(m)	0.59	0.54	0.56
	C.D.at5%	1.82	1.66	1.72

Table 7 Effect of Organic Nutrition on Average fruit yield per plant and fruit yield per hectare of Bottlegourd.

Treatment Notation	Treatment details	Fruit yield per plant (kg/plant)	Fruit yield per hectare (q/ha)
T₁	100% Farmyard Manure	8.36	445.90
T₂	100% Poultry Manure	7.41	395.29
T₃	100% Vermicompost	8.47	451.48
T₄	50% Farmyard Manure+50% Poultry Manure	8.63	460.07
T₅	50% Poultry Manure+50% Vermicompost	9.63	513.60
T₆	50% Farmyard Manure+50% Vermicompost	10.74	572.92
T₇	33% Farmyard Manure+33% Poultry Manure+33% Vermicompost	11.47	611.96
T₀	Control	7.10	378.77
	Mean	1.63	8.98
	'F' Test	S	S
	C.V.	7.32	7.34
	S.E.(m)	0.37	19.96
	C.D.at5%	1.14	61.13

Table 8 Effect of Organic Nutrition on Total soluble solid and Protein content of Bottlegourd.

Treatment Notation	Treatment details	T.S.S.	Protein Content
T ₁	100% Farmyard Manure	3.80	3.70
T ₂	100% Poultry Manure	4.70	3.67
T ₃	100% Vermicompost	3.72	3.80
T ₄	50% Farmyard Manure+50% Poultry Manure	5.10	4.06
T ₅	50% Poultry Manure+50% Vermicompost	4.34	4.13
T ₆	50% Farmyard Manure+50% Vermicompost	3.78	3.80
T ₇	33% Farmyard Manure+33% Poultry Manure+33% Vermicompost	6.28	4.20
T ₀	Control	2.81	2.93
	Mean	4.40	4.32
	'F' Test	S	S
	C.V.	1.32	6.36
	S.E.(m)	0.03	0.14
	C.D.at5%	0.10	0.43