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STUDIES ON ORGANIC AND IN-ORGANICS MANURES ON GROWTH AND YIELD OF BOTTLE GOURD (*LAGENARIA SICERARIA* L.)

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ABSTRACT

The present investigation was carried School of Agriculture Science, Vikrant University, Gwalior. The experiments were laid out in the Randomized Block Design (RBD) with three replications and five treatments to research the effects of organic and inorganic fertilizers on bottle gourd development and yield. The maximum vine length (7.27), number of branches (5.10), number of leaves (250.03), days to first flower (90.90), number of fruits per vine (11.09), fruit length (30.23), fruit girth (18.01) and total yield per plant (25.90). Therefore, combining organic and inorganic fertilizers considerably boosts bottle gourd growth and yield was found to be enhanced by the use of nutrients in combination with both organic and inorganic fertilizers. The results showed that applying this combination to Bottle Gourd had increased the growth and yield under a combination of inorganic fertilizers. Therefore, it may be recommended for the Grower of Bottle Gourd under the open field condition.

Keywords **:** Bottle Gourd (*Lagenaria siceraria* L), Organic, Inorganic Fertilizer, Growth and Yield.

Introduction

Bottle gourd (*Lagenaria siceraria* L.*) Standl.* (2n=22) is an important cucurbitaceous crop grown throughout the country. The bottle gourd, also known as in botanical terminology, is a vine that is a part of the Cucurbitaceae family. The bottle gourd has chromosomal number 2n=22 and can vary in size, shape, and length depending on how and when it is cultivated. It may be consistently cylindrical, curved, bulbous, short and rounded, unusually long and thin, or long and thin. Skin normally has a smooth surface, while certain types have skin that is covered in small hairs. From light green or chartreuse to dark green, it can be any shade of green (Gomez and Gomez, 1984). The internal flesh is creamy white and contains tiny seeds that, while young, are edible and tender but, as they get older, they become hard and must be removed before consumption. Having a firm texture and a mild flavour that are reminiscent of cucumber and summer squash, young bottle gourd squash is satisfying to eat. When young, it can be used in dishes that call for squash as a vegetable (Arriaga and Lowery, 2003).

Once it has reached maturity, it can be dried, hollowed out, and used to make utensils, containers, and the base for Indian musical instruments like the sitar and tanpura. It has a long history and is one of the first plants in the world to be grown. These days, it goes by many different names all over the world, most notably calabash, opo, cucuzza, and long melon (Tripathi *et al.*, 2006). Bottle gourd is a high-nutrient, low-calorie food that is also high in water, vitamins, and minerals. Additionally, it contains a lot of fibre, which is thought to support a healthy digestive system. The vitamin C and zinc content of bottle gourd juice, as well as its capacity to regulate blood sugar levels, are highly regarded (Yadav *et al.*, 2000). The juice is a common beverage consumed for health reasons in India. Toxins that can cause mortality, serious digestive tract damage, and ulcers may be present in bitter bottle gourd juice, so caution should be exercised

when ingesting it. The FIFA World Cup football stadium in Africa was constructed to replicate the size, colour, and texture of a dried Bottle gourd to celebrate its historical significance. It has spread throughout history as a result of human migration, and depending on where it is found, it is now known by a number of different names. It is known as Lauki and Sorakaaya in Indian cuisine, where it has long been a mainstay (Khare *at all,* 2016). The bottle gourd is also used medicinally in several places. Water makes up 96.3% of it, followed by 2.9% carbohydrates, 0.2% protein, 0.5% fat, 0.5% mineral matter, and 11 mg of vitamin C. Being heavily cross-pollinated, it displays significant variation in a variety of traits that are important from a commercial standpoint. Nutrition arrangement is the effective and thoughtful distribution of all the major and minor nutrients to plants. Chemical fertiliser is coupled with farmyard manure, composted poultry manure, vermicompost, neem cake, residual biofertilizer crop material, recyclable waste, and other readily available nutrient sources for sustaining soil fertility, health, and production (Khare *et al.,* 2016).

Materials and Methods

This research study was conducted at the Crop Cafeteria of School of Agriculture Science, Vikrant University, Gwalior. All the facilities necessary for cultivation were made available in the University. In extremely cold winters, it can get as cold as 8°C in December and January, while in extremely hot summers, it can be as hot as 36°C in May and June. Frosts in the winter and hot, sweltering winds in the summer are both typical. The monthly average rainfall is 1013.4 (cm), with the highest concentration occurring from July to September and just sporadic showers during the winter. According to the analysis, the soil in the experimental field had a sandy texture, was low in phosphorus, but relatively high in nitrogen and potash, and had a mildly acidic reaction. The seeds were first sown in a seedling tray and kept under the polyhouse and after the saplings were ready to transplant the area was levelled, the weeds and grasses were pulled with a rake, and a plot measuring 2 x 2.5 metres was prepared before planking and levelling (Tripathi *et al.*, 2006).

Table 1: Showing types of treatment and quantity:

Sl.No.	Types of treatment	
T1	VERMICOMPOST +RDF	25q+RDF
T2	RDF + BIOFERTILIZERS+VERMICOMPOST+FYM	2g/kg seed+25q/ha + RDF
T3	VERMICOMPOST+ FYM + RDF	6g/kg + RDF
T4	RDF+BIOFERTILIZERS+FYM	2g/kg seed + 25q/ha
T5	CONTROL	RDF

The ground was dug up with a shovel and brought to a fine tilt with thorough digging. The experimental plot underwent the necessary pre-sowing procedure with 5 treatment groups and 3 replications, the experiment was set up using a block design. In each replication, different treatments were assigned. The CO1 type was used for the investigation (Kumar e*t al.,* 2015).

The following treatments in order to control are as follows:

vermicompost + RDF, FYM + RDF, Vermicompost + FYM + RDF, bio fertilisers + Vermicompost and control. Observation of the parameters were recorded in each and every plant. Hence, the sampling was used to capture the observations on the plant's numerous properties. Three plants from each plot were chosen and tagged for the observation and recording of the various growth characteristics. Vine length (m), Branch count, Lateral branch length (m), Days to first flower emergence, Number of flowers per plant, Fruit length (cm), Fruit weight (Kg), Fruit diameter (cm), Total yield per plant (Kg), and Fruits per plant. To prevent fertiliser intrusion, ridges were formed between the plots. During the process of soil preparation, seed selection, sowing, irrigation, and weeding, all cultural practises were practised. Insect, weed, and disease infestation were all prevented by taking plant protection measures (Nyiraneza *et al.*, 2007).

Result and Discussions

Application of these individual fertilizers without combination did not have significant increase of yield and related traits but with the great combination of fertilizers and organic manures had significantly increased yield in bottle gourd. The data related to various growth, yield and quality traits in bottle gourd are presented in Table 1 and 2 and that regarding benefit cost ratio were presented in Table 3. Application of recommended dose of fertilizers along with 20 tonnes of FYM had showed the retorted

growth, yield and quality of the bottle gourd compared to all other treatment combinations. The longest vine lenth was founded T2 (7.27) in (FYM + RDF) followed by T3 (6.01), T1 (5.90), T1 (5.90), T4 (5.80) and lowest was founded T5 (4.20). The largest number of branches was reported at T2 (5.10) (FYM + RDF) followed by T3 (4.30), T1 (4.28), T4 (3.91) and T5 (2.33). The number of leaves was reported in T2 (250.03) followed by T1 (200.78), T3 (198.40), T4 (180.90) and T4 (160.56). The days to first flower emergence found is highest T5 (90.90) followed by T4 (70.02), T3 (89.90), T1 (69.89) and (63.45).

Table 2: Effects of organic and inorganic fertilizers of yield and growth on bottle gourd.

Treatments	Main Vine length (m.)	No. of branches per plant	No. of leaves per plant	Days to first flower emergence
Treatment 1	5.90	4.28	200.78	69.89
Treatment 2	7.27	5.10	250.03	63.45
Treatment 3	6.01	4.30	198.40	89.90
Treatment 4	5.80	3.91	180.90	70.02
Treatment5 (Control)	4.20	2.33	160.56	90.90
C.D.	**0.502**	**3.324**	**3.567**	**1.406**
SE (m)	**0.193**	**0.598**	**0.431**	**0.998**
SE(d)	**0.278**	**0.990**	**1.345**	**4.245**
C.V.	**5.102**	**28.899**	**17.456**	**14.30**

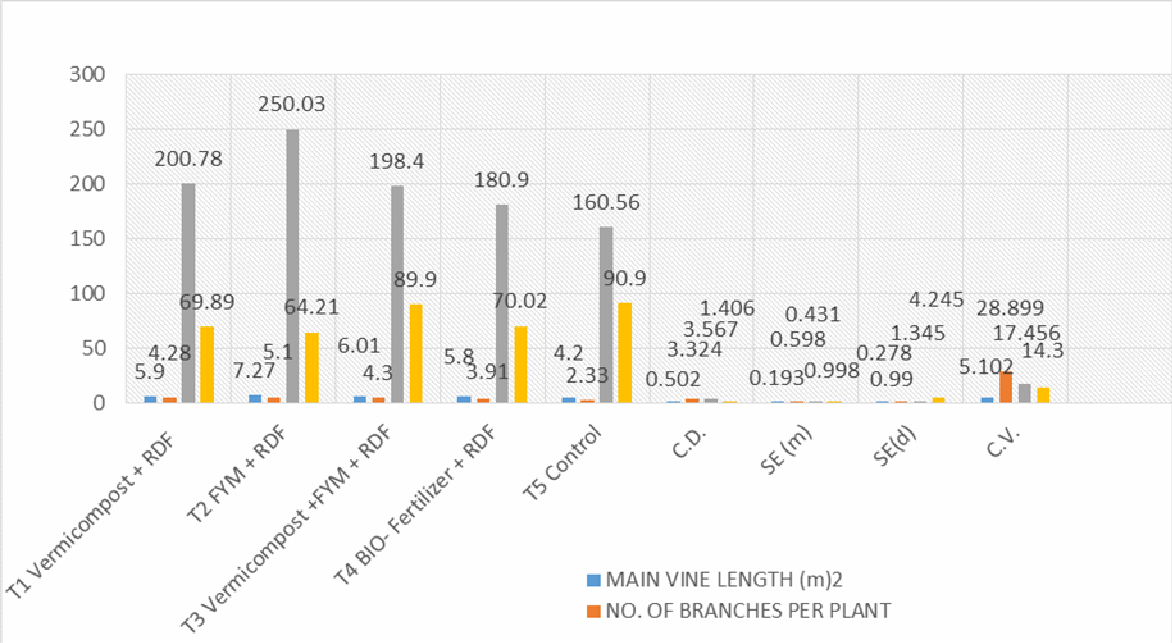

Fig. 1: Effects of organic and synthetic fertilizers on yield and growth of bottle gourd

Table 3: Effects of organic and inorganic fertilizers on yield of bottle gourd

Treatments	No. of fruits per Plant	Fruit length (cm.)	Fruit girth (cm.)	Yield/plant (kg.)
Treatment 1	8.60	26.99	14.78	20.57
Treatment 2	11.09	30.23	18.01	25.90
Treatment 3	9.02	23.90	16.02	19.78
Treatment 4	7.08	19.99	12.90	15.94
Treatment 5 (Control)	4.90	16.01	10.89	10.11
C. D.	**3.61**	**4.70**	**2.90**	**6.12**
SE (m)	**2.81**	**2.13**	**0.99**	**2.10**
SE (d)	**1.89**	**3.15**	**0.95**	**3.23**
C.V.	**3.34**	**27.78**	**50.80**	**24.90**

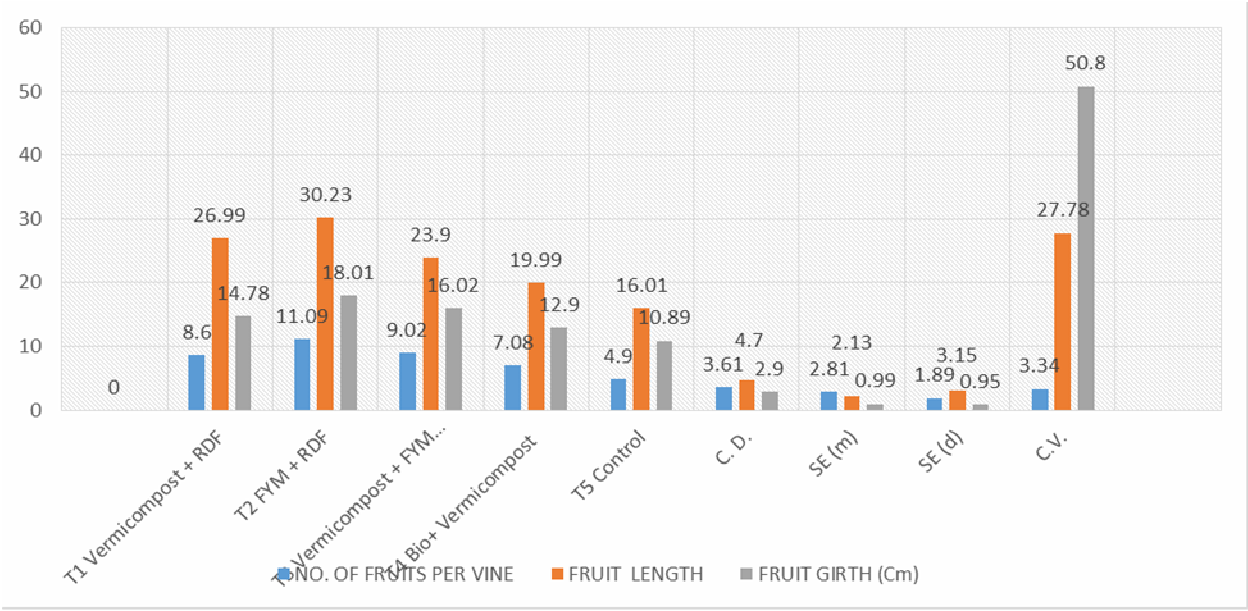

Fig. 2 : Effects of organic and synthetic fertilizers on yield and growth of bottle gourd


1: Transplanting.


2: Inter cultural operation.


3: Starting growth of plant.


4: Fully growing stage of plant.


5: Flowering stage.


6: Fruit setting stage.


7: Fruit development stage.


8: Fruit maturation stage


9: Harvesting stages

Fig. 3 : Bottle gourd growing stages at field.

The number of fruits per vine highest was reported at T3 (11.09) followed by T3 (9.02), T1 (8.60), T4 (7.08) and T5 (4.90). The fruit length highest reported at T2 (30.23) followed by T1 (26.99), T3 (23.90), T4 (19.99) and T5 (16.01). The fruit girth highest founded in T3 (18.01) followed by T3 (16.02), T1 (14.78), T4 (12.90) and T5 (10.89). The total yield per plant was reported in T2 (25.90) followed by T1 (20.57), T3 (19.78), T4 (15.94) and T5 (10.11). The following tables show the information on the number of blooms per plant after applying organic and inorganic fertiliser, as affected by RDF and organic manures in various treatment combinations. Analysing the data showed that there was a clear difference between the treatments in terms of the quantity of blooms produced per plant. According to the results, various treatment combinations resulted in a notable increase in the quantity of female flowers on each plant. which is because organic manure was added. There are still a number of plants that are in the flowering and fruiting stages (King and Chandler, 1978). Therefore, the results indicated that using this combination increased the bottle gourd's growth and yield. Therefore, the farmers may recommend it.

Conclusion

This shows that organic manures and inorganic fertilisers used in conjunction to grow bottle gourd were found to be more successful than organic and inorganic fertilisers used separately because they are a rich source of nutrients and produce the overall growth of bottle gourd plant and yield. The significant result found in fruit length highest reported at T2 (30.23) followed by T1 (26.99), T3 (23.90), T4 (19.99) and T5 (16.01), fruit girth highest founded in T3 (18.01) followed by T3 (16.02), T1 (14.78), T4 (12.90) and T5 (10.89), total yield per plant was reported in T2 (25.90) followed by T1 (20.57), T3 (19.78), T4 (15.94) and T5 (10.11). Therefore, it was determined that treatment T2 (FYM + RDF) was the most effective method in terms of maximum yield and yield-attributing characteristics, and growers may be advised to use it.

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