



Influence of Spent Mushroom Compost and Inorganic fertilizers on Growth Attributes, Yield and Soil Characteristics of Bottle Gourd

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Summary: *A field experiment were conducted Agricultural Research farm Baba Ragav Das Post Graduate College, Deoria, U.P. India, during Kharif season 2016 to 2017 to study the response of organic manures and inorganic fertilizer on growth attributes yields and soil characteristics of Bottle gourd on sandy loam soil. Button mushroom Spent mushroom compost (BM-SMC) were applied during preparation of field. The maximum growth attributes and yields of Bottle gourd recorded in 5 tones BM-SMC integrated with 50% RDF followed by 4 tones BM-SMC with 75% RDF and 6 tonnes BM-SMC with 25% RDF. The Soil pH slightly decrease while EC, OC available N P and K were increase due to organic manures addition in soil. The mineralization of organic manures to inorganic nutrients to available NPK buildup in soil.*

Bottle gourd is an important cucurbitaceae vegetable crop extensively grown in different part of the country. The fruit may be long, oblong or rounds in shape depending on the variety. Tender fruits are widely used as cooked vegetable in a number of ways. In Northern India "Kofta" is most popular vegetable preparation. Immature fruits are used with milk for the preparation of different sweets like "Kheer", "Payesh" and "Halwa". Matured fruits are also used for the preparation of different sweets like "Petha" and "Burfi". Edible portion of Bottle gourd contains 0.2% protein, 2.9% carbohydrates and 0.5% fats and 11.0 mg vitamin C per 100 g fresh edible portion. The young leaves are rich in carbohydrates 6.1% and proteins 2.5%. Integrated use of organic manures and inorganic fertilizer to improved soil physical, chemical and biological properties and fulfill nutrients requirements. The main objective of organic manures and inorganic fertilizers plant nutrient management is to minimize the use of inorganic fertilizers.

Button mushroom Spent mushroom compost, although grow and balance essential nutrient supply to crops. The continuous use of integrated nutrients management to improved soil fertility and productivity. The organic manures have narrow C: N ratio and it does mineralize rapidly after incorporation into the soil resulting release of nutrients for the use of growing crops (Bhandari et. al 1992). Soil organic matter greatly affects the biology of the soil hence it gives most of energy and body building constituents of the microorganisms whose transformation of unavailable nutrient to available nutrients utilized by crops and produce higher yields as well as soil fertility also improved. Soil organic matters have certain organic compounds like plant growth hormones have direct enhancing effect on plant growth.

Materials and Methods- The experiment was conducted at agricultural research form of BRDPG, College, Deoria affiliated to Deen Dayal Upadhyay Gorakhpur University, Gorakhpur (U.P.) during rainy season of 2016 and 2017. The soil was sandy loam with soil pH 7.7 EC 0.26 dSm⁻¹ OC 0.36% available N, P and K 202, 15.30 and 170 kg ha⁻¹ respectively. The experiment was laid out Randomized Block Design with three replication of each treatment. Bottle gourds were sown in the field at a spacing of 2X1 m in the plot of 4X3 m size. Five plants were selected at random from each plot of each treatment as representative sample for observation the data. There were eleven treatment which included various contribution of T1 control T2 RDF (100:60:60 kg ha⁻¹), T3 2.5 tonnes BM-SMC ha⁻¹, T4 5 tonnes BM-SMC ha⁻¹, T5 7.5 tonnes BM-SMC ha⁻¹, T6 10 tonnes BM-SMC ha⁻¹, T7 12.5 tonnes BM-SMC ha⁻¹, T8 -T6 + 25% RDF ha⁻¹, T9 T5 + 50% RDF ha⁻¹, T10- T4+ 25% RDF ha⁻¹, T11 - T3 + 100% RDF ha⁻¹. Bottle gourd seeds were sown at 2/2/1016 in the first year and 4/07/2017 in the second year. Applied BM-SMC in the experimental plot at field preparation. Soil sample



were taken before addition of organic manure and after harvest of Bottle gourd. The basal application of 60 kg P₂O₅ and 16 kg K₂O through single super phosphate and potassium chloride was done further the Bottle gourd received nitrogen dosages as per treatments through urea at the rate of 1/3 before sowing as basal remaining 2/3 of N applied in to split dosages first split dosages to be applied 25-30 days after sowing and second dosages at flowering stage. Standard method and procedure were followed for analysis of soil such as pH and EC in 1:2.5 soil and distilled water suspension with the help of pH and EC meter method (Jackson 1973) OC in soil sample by wet chromic acid digestion method (Walkeley and Black 1934) available NPK in soil by alkaline per magnate method (Subbiah and Asiza 1956), Olsen method (Olsen et.al 1954) and Neutral ammonium acetate method (Jackson 1973) respectively.

Results and Discussion- Influence of organic and inorganic on growth attributes of Bottle gourd The data reveals that Bottle gourd (Table 1) gave maximum growth attributes and yield were days taken to appearance of first female flower (58), length of main vine (M) (5.50), number of primary branched per vine (14.60), number of fruits per vine (23.29) and yield Q ha⁻¹ (294.70) in T₉ followed by T₁₀ and T₈. The reason for increase fruits yield in Bottle gourd were attributed to the increased solubilization effect and availability of nutrients by the incorporation of BM-SMC and increased physiological activities to the buildup of sufficient nutrient reserve for the developing sinks and better portioning toward the developing fruits. These observations are also agreement with finding of Satish et. al (1917). The addition of BM-SMC in plot leading to fast mineralization might have released nutrients at faster rate resulting into maximum growth attributes and yield of Bottle gourd. The significant enhancement in soil NH₄-N oxidized to NO₃-N at different stage of Bottle gourd. These observations are also in agreement with finding of Goswami et.al. (1988).

Data given in Table 2 reveals that after harvest of Bottle gourd treated with incorporation of BM-SMC combine with fertilizers slightly reduce soil pH and increase EC of soil as compared to controlled plots. Reduced pH was in treatment received BM-SMC with inorganic fertilizers organic manure effect soil pH due to produced organic acid and CO₂ during decomposition which can furnish to soil inducing a decreased in soil pH. The generally showed that slightly changed EC appeared by applied BM-SMC can combined with fertilizer which increase EC due to soluble salt. The similar results were reported by Dekhamedhi and Datta (1995).

The data pertaining to available N P K status of soil after harvest of Bottle gourd in given Table 2 data reveals that available N P and K content was increased in the soil due to organic manures incorporation along with fertilizer application. After harvest of Bottle gourd a considerable buildup in soil fertility due to organic manures in combination with fertilizers improved availability of N

P and K contents in soil significantly as compared to control plot. The increased the available N due to organic material application might be also attributed to the greater multiplications microbes caused by the addition of organic materials for the conversion of organically bound N to inorganic form. The results are agreements with Sharma et.al. (2001).

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Table-1 Effect of organic manures and inorganic fertilizers on growth attributes yield of Bottle gourd (Pooled two generation data)

Treatment	Days taken to appearance of first female flower	Length of main vine (m)	No of primary branches per vine	No of fruit per vine	Yield (q ha ⁻¹)
T1	71	4.34	10.85	11.89	138.40
T2	67	5.43	14.05	14.97	245.14
T3	59	5.28	13.45	16.10	277.62
T4	61	5.26	13.33	20.67	262.72
T5	63	5.19	13.17	20.70	243.38
T6	64	5.86	13.5	20.28	232.73
T7	65	4.91	12.95	14.97	220.54
T8	63	4.99	13.65	21.15	283.85
T9	58	5.50	14.60	23.29	294.70
T10	60	5.42	14.35	22.68	287.91
T11	61	5.31	13.83	18.51	276.61
SEm±	0.54	0.18	0.35	0.87	8.32
CD (P=0.05)	1.45	0.46	0.92	2.52	22.71

Table -2 Effects of organic manures and inorganic fertilizers on soil chemical properties after harvest of Bottle gourd (Pooled to year data)

Treatments	pH		EC (dSm ⁻¹)	O C (%)		Available Nutrients (kg)
	N	P		K		
T1	7.8	0.26	0.34	181.62	14.10	171.12
T2	7.8	0.24	0.38	205.60	16.80	186.40
T3	7.7	0.31	0.43	211.14	16.92	192.20
T4	7.7	0.31	0.43	208.15	18.67	189.20
T5	7.6	0.30	0.43	207.27	18.82	185.30
T6	7.7	0.29	0.42	205.10	18.20	184.18
T7	7.6	0.27	0.39	201.65	17.40	183.62
T8	7.5	0.31	0.45	203.13	18.62	194.20
T9	7.5	0.29	0.46	217.92	19.24	195.60
T10	7.6	0.29	0.42	207.82	18.52	193.40
T11	7.7	0.27	0.41	205.60	17.40	184.50
SEm±	0.09	0.01	0.04	1.70	1.24	2.18
CD(P=0.05)	NS	0.03	1.15	4.88	3.52	6.34
Initial Soil	7.8	0.26	0.36	202.14	14.70	170.54