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Effect of Enriched Municipal Solid Waste Compost Application on Growth, Plant Nutrient Uptake and Yield of Rice

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Abstract: A field experiment was conducted at Tamil Nadu Agricultural University, Coimbatore, India, to study the effect of Enriched Municipal Solid Waste Compost (EMSWC) application on growth, plant nutrient uptake and yield of rice in RBD during the year of 2004. The growth attributes viz., plant height, leaf area index, number of tillers and dry matter production differed significantly due to different treatments. These attributes increased significantly owing to the application of enriched compost, which has enhanced nutrient level, which leads to the continuous availability of nutrients in available form to the plants. The highest grain yield and straw yield were observed in the treatment combination of 25% of enriched compost and 75% of recommended dose of inorganic fertilizer (T_5) with value of 5.22 and 8.65 t ha^{-1}, respectively. Application of 5 t ha^{-1} enriched MSWC in combination with 25% N through inorganic fertilizer recorded grain yield of 4.33 t ha^{-1}. The lowest grain yield (3.78 t ha^{-1}) was recorded in treatment where the compost was applied alone.

Key words: EMSWC, growth attributes, nutrient uptake and yield

INTRODUCTION

In urban areas, especially in the rapid urbanizing cities of the developing world, problems and issues of Municipal Solid Waste Management (MSWM) are of immediate importance. Land filling disposal of wastes contributes flooding, breeding of insect and rodent vectors, the spread of diseases and polluting ground water quality. Composting is the simplest yet best process for solid waste management. It is basically a special form of waste stabilization that requires special conditions of moisture and aeration to produce stable compost that can be used as a low-grade manure and soil condition. City compost produced at mechanical composting plants throughout the Asia-Pacific region (India, Nepal, Pakistan, Philippines, Indonesia and Thailand) are generally low in plant nutrients and therefore their acceptability by farmers has been poor (Gaur and Singh, 1993). Hence enrichment is necessary for improving nutrient status and quality of compost. Considering the nutritional significance and quality of the compost, the study was conducted to enrich the urban solid waste compost with agricultural and industrial waste products such as composted poultry litter, diluted spent wash, rock phosphate and microbial inoculants. The present study was undertaken to evaluate the enriched municipal solid waste compost on rice growth, Plant Nutrients (NPK) uptake and yield.

MATERIALS AND METHODS

Compost for this investigation was obtained from a mechanical composting plant. The Compost was enriched with composted poultry litter (10%), diluted spent wash (10%), rock phosphate (0.5%) and microbial consortium (0.5%) consist of *Azotobacter*, Phosphobacteria and *Pseudomonas*. Some chemical constituents of the enriched and unenriched compost material are shown in Table 1.

A field experiment was conducted during Kharif 2004 at Wetland farm, Tamil Nadu Agricultural University, Coimbatore that is geographically situated in the North Western part of Tamil Nadu at 11°N latitude and 77°E longitude at an altitude of 426.72 m above Mean Sea Level (MSL). The soil of the experimental field was deep, moderately drained, clay loam and taxonomically classified as Typic haplustalf. The soil nutrient status was low (224 kg ha^{-1}), medium (19.20 kg ha^{-1}) and high (498.00 kg ha^{-1}) for available nitrogen, phosphorous and potassium, respectively. The composite soil samples collected prior to the experiment were analysed and presented in Table 2. The experimental field was irrigated with good quality water from a bore-well situated near by the field. The field experiment was conducted using rice variety ADT 43 with duration of 110 days.

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Table 1: Chemical components in the MSW compost

	Concentration	
Parameters	Unenriched MSW compost	Enriched MSW compost
pH	8.10	7.88
EC (dS m^{-1})	2.23	4.88
Organic Carbon (%)	11.25	10.44
Nitrogen (%)	0.64	1.75
Phosphorus (%)	0.56	1.16
Potassium (%)	0.70	1.83
Calcium (%)	2.32	4.18
Magnesium (%)	0.65	0.97
Sodium (%)	0.66	0.75
Copper (mg kg^{-1})	317.00	223.00
Zinc (mg kg^{-1})	1303.00	2110.00
Iron (mg kg^{-1})	12659.00	16923.75
Manganese (mg kg^{-1})	301.00	345.05

Table 2: Physical and Physio-chemical properties of the soil of the experimental field

Parameters	Values
Bulk density (g cc^{-1})	1.11
Particle density (g cc^{-1})	1.81
Porosity (%)	44.44
pH	8.15
EC (dS m^{-1})	0.56
Organic carbon (%)	0.63

The experiment was laid out in a Randomized Block Design with three replications. All the treatments were allotted at random to plots within each replication. The experimental layout was kept undisturbed throughout the course of investigation. The treatments are given below. The treatment plots were applied with compost before the transplanting of the crop.

Treatment details:

T_1 = Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N, P, K)
T_2 = 100% N through Municipal Solid Waste Compost (MSWC)
T_3 = 100% N through Enriched Municipal Solid Waste Compost (EMSWC)
T_4 = 75% N through Inorganic fertilizers + 25% N through MSWC
T_5 = 75% N through Inorganic fertilizers + 25% N through EMSWC
T_6 = 5 t of EMSWC + 25% N through Inorganic fertilizers
T_7 = 5 t of Vermicompost + 25% N through Inorganic fertilizers.

Biometric observations: Biometric observations were recorded as per the guidelines stipulated by All India Co-ordinated Rice Improvement Project (Ten Have, 1977). In each plot, five plants were selected at random and labeled for recording following observations.

Growth characters

Plant height: The height of the plants from the ground level to the tip of the largest leaf stretched was measured on 30 DAT (Days after transplanting), 60 DAT and at harvest stage and expressed in cm.

Number of tillers: Total number of tillers were counted on 30 DAT, 60 DAT and at harvest stage and expressed as number of tillers per $hill^{-1}$.

Leaf Area Index (LAI): After 30 DAT, 60 DAT and 90 DAT leaf area index was worked out by using the following formula as suggested by Palaniswamy and Gomez (1974).

$$\frac{L \times W \times N}{\text{Spacing adopted}(cm^2)}$$

Where:
L = Maximum length of the 3rd leaf blade from the top (cm)
W = Maximum width of the leaf blade (cm)
K = Constant factor (0.75 for Kharif season rice)
N = Number of leaves per hill.

Dry Matter Production (DMP): Five hills were selected at random and pulled out from sampling area on 30 DAT, 60 DAT and at harvest stages. These samples were, air-dried and then oven dried at 72°C for 72 h. The plants were weighed and expressed as kg ha^{-1}.

Plant analysis

Plant samples: The plant samples collected for recording dry matter production were chopped into pieces, dried and ground into fine powder in a Wiley mill and used for chemical analysis. N, P and K were estimated using the methods as shown in the following Table.

Methods used for analyzing nutrients of plant samples

Parameters	Methods	Author
Total N (%)	Microkjeldahl method	Humphries (1956)
Total P (%)	Colorimeteric method	Jackson (1973)
Total K (%)	Flamephotometry method	Jackson (1973)

Yield

Grain and straw yields: Grains harvested from each net plot area were dried and weighed at 14% moisture content and expressed as kg ha^{-1}. Straw from each plot was sun dried and straw yield was expressed as kg ha^{-1}. Analysis of variance was used to test significance ($p<0.05$) of treatment effects.

Table 3: Effect of enriched municipal solid waste compost on growth attributes of rice (Var. ADT 43)

	Growth atributes															
	Plant height (cm)				Number of Tillers				Leaf Area index				Dry matter production (kg ha^{-1})			
Treatments	30 DAT	60 DAT	At harvest	Mean	30 DAT	60 DAT	At harvest	Mean	30 DAT	60 DAT	At harvest	Mean	30 DAT	60 DAT	At harvest	Mean
T_1	44.46	66.93	73.85	61.75	8.13	8.60	8.73	8.49	3.45	3.75	3.48	3.56	2022	7456	12605	7361
T_2	38.40	59.63	68.48	55.50	7.20	7.46	6.80	7.15	2.66	2.88	2.63	2.72	1497	5808	10642	5982
T_3	40.26	63.42	70.09	57.92	7.40	7.86	7.40	7.55	2.73	2.94	2.71	2.79	2300	6635	11100	6678
T_4	44.92	69.29	74.34	62.85	8.33	8.53	8.16	8.34	3.01	3.49	3.42	3.31	2164	7094	12418	7225
T_5	45.56	71.41	76.12	64.36	8.60	8.66	9.26	8.84	3.25	3.76	3.46	3.49	2478	7358	12798	7545
T_6	41.62	61.73	70.34	57.90	7.40	7.56	7.86	7.61	2.86	3.21	3.12	3.06	1912	6483	11768	6721
T_7	42.36	59.40	72.15	57.97	6.60	7.00	7.57	7.06	2.95	3.05	3.00	3.00	1548	6240	11691	6493
Mean	42.51	64.54	72.20		7.67	7.95	7.97		2.99	3.30	3.12		1989	6725	11860	
	SEd			CD	SEd		CD	SEd			CD	SEd				CD
T	0.18			3.70	0.47		0.94	0.24			0.48	214.35				433.13
D	1.20			2.42	0.31		0.62	0.16			0.32	140.33				283.62
T × D	3.17			6.41	0.81		1.64	0.41			0.83	371.27				750.39

T^1 - Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N, P, K), T_2 - 100% N through Municipal Solid Waste Compost (MSWC), T_3- 100% N through Enriched Municipal Solid Waste Compost (EMSWC), T_4- 75% N through Inorganic fertilizers + 25% N through MSWC, T_5- 75% N through Inorganic fertilizers + 25% N through EMSWC, T_6- 5 t of EMSWC +25% N through Inorganic fertilizers, T_7- 5 t of Vermicompost +25% N through Inorganic fertilizers

RESULTS AND DISCUSSION

Enriched compost application effect on rice biometrics

Plant height: The plant height increased with the advancement of crop growth stages and it was highest at harvest. T_5 (75% N through Inorganic fertilizers + 25% N through EMSWC) treatment exerted marked influence on the plant height at all the stages viz., 30 DAT, 60 DAT and harvest stages with values of 45.56, 71.41 and 76.12 cm respectively (Table 3). This was closely followed by T_4 (75% N through Inorganic fertilizers + 25% N through MSWC) treatment and T_1 (Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N, P, K)) treatment significantly with values of 44.92 (30 DAT), 69.29 (60 DAT), 74.34 (at harvest) and 44.46 (30 DAT), 66.93 (60 DAT), 73.85 (at harvest), respectively as compared to other treatments. The lowest plant height was recorded in T_2 (100% N through) treatment at all stages of crop growth.

Application of enriched compost in combination with mineral fertilizer had a favorable effect on plant height over the application of inorganic fertilizer alone. Maximum plant height was observed in the treatment where the plot was applied with 75% of recommended inorganic fertilizer and 25% of nitrogen through enriched compost. The increase in plant height might be due to the enhanced nutrient level in the compost and fertilizer, which leads to the continuous availability of nutrients in available form to the plants. Similar results were reported by Ali *et al.* (2003) in tomato, the application of 25% rice straw compost gave the highest stem length followed by 50% and then 75% compost whereas, 100% peat and compost decreased plant height with no significant differences between them.

Tiller production: The data on mean tillers per hill recorded for each treatment at different stages viz., 30 DAT, 60 DAT and at harvest are furnished in the Table 3. T_5 (75% N through Inorganic fertilizers + 25% N through EMSWC) treatment showed significantly higher total number of tillers among the treatments at all the stages. At 30 DAT, the number of tillers per hill was more in T_5 treatment with value of 8.60. This was followed by T_4 (75% N through Inorganic fertilizers + 25% N through MSWC) and T_1 (Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N, P, K)) with values of 8.33 and 8.13 per hill respectively. Combination of EMSWC (5 t ha^{-1}) and inorganic fertilizer (25% of recommended dose) i.e., T_6 treatment recorded the tiller value of 7.40 per hill, which was on par with T_3 (100% N through EMSWC) treatment. Similar trend in the number of tillers per hill was observed at 60 DAT and at harvest stage also.

Tiller production is very important in rice as it is directly related to final productive tillers at harvest. Tillering was markedly influenced by the addition of the enriched compost in the treatments. Tiller production was maximum in the treatments where the enriched compost was applied along with inorganic fertilizer. Availability of sufficient quantity of nutrients at the growth phases of plant recorded the maximum tiller production. This finding was similar to that reported by Clements (1980), tillering is having significant correlation with the supply and availability of N nutrients.

Leaf area index: In general, there was a marked increase in LAI at 60 DAT as compared to harvest stage. T_5 (Recommended Inorganic fertilizer: Enriched Municipal Solid Waste Compost- 75:25) treatment had registered

Table 4: Effect of enriched municipal solid waste compost on nutrient uptake of rice (Var. ADT 43)

	Nutrient uptake (kg ha^{-1})											
	Nitrogen uptake				Phosphorous uptake				Potassium uptake			
Treatments	30 DAT	60 DAT	At harvest	Mean	30 DAT	60 DAT	At harvest	Mean	30 DAT	60 DAT	At harvest	Mean
T_1	32.13	59.05	75.43	55.54	4.19	8.86	12.20	8.42	38.90	117.25	245.62	133.92
T_2	18.10	42.03	54.52	38.22	3.09	7.44	9.87	6.80	28.57	92.08	214.30	111.65
T_3	28.49	47.59	60.35	45.48	4.80	8.13	11.75	8.23	44.55	101.13	228.29	124.66
T_4	30.31	54.86	73.65	52.94	4.63	7.88	11.36	7.96	40.86	122.80	261.25	141.64
T_5	32.74	64.36	76.74	57.95	5.29	10.26	12.74	9.43	49.42	129.48	268.94	149.28
T_6	20.77	52.99	57.28	43.68	4.01	9.03	10.31	7.78	36.43	108.78	239.67	128.29
T_7	17.90	39.86	62.34	40.03	3.36	8.93	11.47	7.92	30.39	105.88	263.69	133.32
Mean	25.78	51.53	65.76		4.20	8.65	11.39		38.45	111.06	245.97	
	SEd			CD	SEd			CD	SEd			CD
T	0.266			0.537	0.790			1.597	0.686			1.387
D	1.738			0.351	0.517			1.046	0.449			0.908
T × D	0.459			0.929	1.369			2.767	1.188			2.403

T_1 - Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N,P,K), T_2 - 100% N through Municipal Solid Waste Compost (MSWC), T_3 - 100% N through Enriched Municipal Solid Waste Compost (EMSWC), T_4 - 75% N through Inorganic fertilizers + 25% N through MSWC, T_5 - 75% N through Inorganic fertilizers + 25% N through EMSWC, T_6 - 5 t of EMSWC +25% N through Inorganic fertilizers, T_7 - 5 t of Vermicompost +25% N through inorganic fertilizers

significantly higher value of LAI (3.76) among the other treatments at 60 DAT (Table 3). This was followed by treatments in the order of T_1, T_4, T_6, T_7 and T_3 with LAI values of 3.75, 3.49, 3.21, 3.05 and 2.94 respectively. At harvest, similar trend was observed with regard to LAI as in 60 DAT. Among the treatments T_2 (100% N through MSWC) recorded the lowest value of LAI (2.88).

The maximum leaf area index was in the treatment where the enriched compost was applied along with inorganic fertilizer. In accordance with the above results, Ali *et al.* (2003) stated that the application of 25% rice straw compost along with 75% recommended inorganic fertilizers to tomato increased the leaf area index, plant height and seed germination.

Dry matter production: The data regarding dry matter production are presented in Table 3. In general, the dry matter production ranged from 1497 to 2478, 5808 to 7456 and 10,642 to 12,798 kg ha^{-1} at 30 DAT, 60 DAT and harvest stages respectively. It was observed that the treatment T_5 (75% N through Inorganic fertilizers + 25% N through EMSWC) recorded the highest (2478 kg ha^{-1}) dry matter production at 30 DAT followed by T_4 (2164 kg ha^{-1}) which were on par with each other. The lowest dry matter production (1497 kg ha^{-1}) was recorded in T_2 (100% N through MSWC).

The DMP recorded at 60 DAT was higher (7456 kg ha^{-1}) in the T_1 (Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N, P, K)) treatment and this was on par with T_5 treatment. At harvest stage, the highest DMP (12789 kg ha^{-1}) was recorded in T_5 treatment, which was on par with T_4 (75% N through Inorganic fertilizers + 25% N through MSWC) and T_1 treatments with values 12,418 and 12,605 kg ha^{-1}, respectively.

Combination of inorganic fertilizer and enriched compost positively influenced he dry matter production of rice at different growth stages. Higher Dry Matter Production (DMP) was recorded in the treatment where 75% of recommended inorganic fertilizer and 25% of N through enriched compost was applied, at all stages of crop growth. Plant growth biomass is the indicator of good uptake of nutrients from the soil. When organic manure was applied with inorganic fertilizer more nutrient uptake happened in the plant system and so more plant biomass was recorded. Kelling *et al.* (1977) and Voagtmann and Fricke (1989) also have found that compost application had the stimulation effect on sesame shoots and roots dry weight at different growth stages.

Enriched compost application effect on plant available macronutrients

Nitrogen uptake: The N uptake increased with advancement in age and the maximum was recorded at harvest stage (Table 4). Among the treatments studied at three stages viz., 30 DAT, 60 DAT and at harvest, significantly higher N uptake was noticed in the T_5 (75% N through Inorganic fertilizers + 25% N through EMSWC) treatment. At 30 DAT, the recorded value of N uptake was 32.74 kg ha^{-1}. This was followed by the application of recommended NPK (T_1) and T_4 (75% N through Inorganic fertilizers + 25% N through MSWC) with values of 32.13 and 30.31 kg ha^{-1}, respectively. The lowest value was recorded in the treatment T_2 (100% N through MSWC) with a value of 18.10 kg ha^{-1}. Similar trend of N uptake was observed up to harvest stage. The results were in line with previous work done by Kropisz and Wojciechowsky (1978 a, b) and Kropisz and Russel (1978). They indicated that the combined application of triple-fertilizer NPK and municipal garbage compost slightly increases the N content of several types of crops when compared to the application of mineral fertilizer alone.

Phosphorus uptake: Similar to N uptake, the P uptake also found increased with aging of rice crop and maximum was recorded at harvest stage (Table 4). T_5 (75% N through Inorganic fertilizers + 25% N through EMSWC) recorded significantly higher P uptake among the treatments studied. At 30 DAT, the value of P uptake noticed in T_5 treatment was 5.29 kg ha^{-1} that was followed by T_3 (100% N through EMSWC) and T_4 (75% N through Inorganic fertilizers + 25% N through MSWC) with values 4.80 and 4.63 kg ha^{-1}.

At 60 DAT, maximum P uptake (10.26 kg ha^{-1}) was observed in T_5 and this was followed by T_6 (5 t of EMSWC + 25% N through Inorganic fertilizers) and T_7 (5 t of Vermicompost + 25% N through Inorganic fertilizers) with values 9.03 and 8.93 kg ha^{-1}, respectively. Similar to two stages, at harvest stage also, maximum uptake was found in T_5 treatment with value 12.74 kg ha^{-1} and it was followed by T_1 (absolute control) and T_3. The lowest value of P uptake was observed in the T_2 (100% N through MSWC) treatment at all stages of crop growth.

The results can be evident from the findings of Bengston and Cornette (1973) and King *et al.* (1977) that the addition of composts to soil does not produce significant changes in plant phosphorus concentration producing, at most, slight increase in the amount of this nutrient when high doses of compost were used (Duggan and Wiles, 1976).

Potassium uptake: Significantly highest K uptake was recorded at T_5 (75% N through Inorganic fertilizers + 25% N through EMSWC) with values 49.42, 129.48 and 268.94 kg ha^{-1} at 30 DAT, 60 DAT and harvest stages respectively (Table 4). This was followed T_3 (100% N through EMSWC) and T_4 (75% N through Inorganic fertilizers + 25% N through MSWC) at 30 DAT and by T_4 and T_1 (Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N, P, K) at 60 DAT, respectively. At harvest stage, T_5 was followed by T_7 (5 t of Vermicompost + 25% N through Inorganic fertilizers) and T_4 treatments. The lowest K uptake was recorded in T_2 (100% N through MSWC) treatment at all stages, respectively.

The results could also be proved by the report of Bengston and Cornette (1973), Duggan and Wiles (1976) that the incorporation of the garbage compost leads to significant increase in plant potassium content. Generally, it has been claimed that potassium is present in compost in an easily assimilated form. Hortenstine and Rothwell (1969) found that the addition to soil of 512 metric tones of compost per hectare resulted in the extraction of 50 times more K by millet crops when compared to control crops.

Table 5: Effect of enriched municipal solid waste compost on yield parameters of rice

Treatments	Grain yield (kg ha^{-1})	Straw yield (kg ha^{-1})
T_1	5.02	7.82
T_2	3.78	5.03
T_3	4.13	5.92
T_4	4.69	6.95
T_5	5.22	8.65
T_6	4.33	6.93
T_7	4.24	6.33
SE d	0.17	0.74
CD (0.05)	0.38	1.62

T_1-Recommended dose of NPK through Inorganic fertilizers (120: 38: 38 kg ha^{-1} of N, P,K), T_2-100% N through Municipal Solid Waste Compost (MSWC), T_3-100% N through Enriched Municipal Solid Waste Compost (EMSWC), T_4-75% N through Inorganic fertilizers + 25% N through MSWC, T_5-75% N through Inorganic fertilizers + 25% N through EMSWC, T_6-5 t of EMSWC +25% N through Inorganic fertilizers, T_7-5 t of Vermicompost +25% N through inorganic fertilizers

Enriched compost effect on yield of rice

Grain yield: Grain yield of rice was significantly influenced by different treatments (Table 5). Among the treatments 75% recommended inorganic fertilizers along with 25% of nitrogen through enriched compost (T_5) recorded higher grain yield (5.22 t ha^{-1}) than other treatments. This was followed by the application of recommended NPK (T_1) and T_4 (75% N through Inorganic fertilizers + 25% N through MSWC) with value of 5.02 t ha^{-1} of 4.69 t ha^{-1}, respectively. As compared to individual application of compost and inorganic fertilizer their combination recorded higher grain yield of rice. Lowest grain yield (3.78 t ha^{-1}) where the plot was applied with unenriched compost alone.

Straw yield: The highest straw yield (8.65 t ha^{-1}) was obtained under the application of 75% recommended inorganic fertilizer along with 25% of nitrogen through enriched compost (T_5) treatment. This was followed by the application of recommended NPK (T_1) and T_4 75% N through Inorganic fertilizers + 25% N through MSWC) with values of and 7.82 and 6.95 t ha^{-1} respectively. T_2 (100% N through MSWC) significantly recorded lowest straw yield (5.03 t ha^{-1}) as compared to all other treatments.

Enriched compost treatment in conjunction with inorganic fertilizer has produced higher grain yield and straw yield than the application of inorganic fertilizer alone.

The treatment could have provided enough nutrients with better physical and microbial environment, thus improving soil fertility, which ultimately resulted in higher yield. Application of 25% of enriched compost along with 75% of recommended inorganic fertilizer produced 5.23 t ha^{-1} whereas the application of inorganic fertilizer alone produced 5.02 t ha^{-1}. The pronounced effect of yield of rice might be due to the decomposition of compost which forms easily available nutrients like N, P, K as well as micronutrients such as Zn, Fe, Mn and Cu. Compost act as a slow releasing fertilizer and it supplies plant nutrients slowly but continuously. The yield obtained in the unenriched compost was relatively lower when compared with enriched compost.

In accordance with above results, Chattopadhyay *et al.* (1992) also found that the urea application in combination with city waste compost out yields all the treatments, there is a significant difference between combined treatment of urea and compost and application of urea alone in respect of grain yield of rice.

Application of 112 t ha^{-1} municipal solid waste compost 90 days before planting increased watermelon production by 30% as compared to South West Florida commercial average (Obreza and Reeder, 1994). Reddy (2000) also demonstrated that application of compost at 20 t ha^{-1} produces significantly higher yields of brinjal and bhendi crops. The results can also be evident from the findings of Hadas *et al.* (2004) reported that grain yield of wheat and other rainfed crops were responded well to mulching with composted municipal solid waste.

CONCLUSION

The plant height, LAI and number of tillers were favorably influenced by enriched compost application at all the stages. The highest value for plant height was obtained in the treatment combination of 75% of recommended inorganic fertilizer and 25% of enriched compost. Compost application significantly influenced the dry matter production. Higher dry matter production (12.79 t ha^{-1}) was observed in same treatment combination as in plant height. The uptake of macronutrient level in plant parts were enhanced to a significant level with an application of enriched compost. Highest grain and straw yield were recorded in enriched compost applied field that was significantly higher comparable to recommended NPK through inorganic fertilizer applied field. Application of enriched compost in conjunction with inorganic fertilizer has been found viable with increased rice productivity and enhanced soil fertility status than recommended fertilizer application alone. Hence it is indicated from the experiment that the growth attributes viz., plant height, leaf area index, dry matter production and number of tillers $hill^{-1}$, nutrient uptake and yield of rice were significantly influenced by the application of enriched compost along with inorganic fertilizers.

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