ZIBELINE INTERNATIONAL™ PUBLISHING

ISSN: 2710-6012 (Online)
CODEN: JWBMAO

Journal of Wastes and Biomass Management (JWBM)

DOI: http://doi.org/10.26480/jwbm.02.2022.78.82

CrossMark

RESEARCH ARTICLE

EFFECT OF KITCHEN WASTE COMPOST ON TOMATO YIELD AND CARBON ACCUMULATION IN SOIL

M. Yasmin*[a], M.S. Rahman[b], M.A. Rahman[a], J. Rahman[c], F.S. Shikha[a], R. Sultana[d]

[a] Soil Science Division, Bangladesh Agricultural Research Institute, Jamalpur-2000, Bangladesh.
[b] Tuber Crop Research Centre, Bangladesh Agricultural Research Institute, Jamalpur-2000, Bangladesh.
[c] Agronomy Division, Bangladesh Agricultural Research Institute, Jamalpur-2000, Bangladesh.
[d] Horticulture Research Centre, Bangladesh Agricultural Research Institute, Jamalpur-2000, Bangladesh.
**Corresponding Author Email: monirayasmin86@yahoo.com*

ARTICLE DETAILS

Article History:

Received 28 May 2022
Accepted 30 June 2022
Available online 07 July 2022

ABSTRACT

Two years field study was conducted on the effect of kitchen waste compost on tomato yield and carbon accumulation in soil at Regional Agricultural Research Station (RARS), Jamalpur, Bangladesh under Old Brahmaputra Floodplain (AEZ 9) during rabi season of 2020-2021 and 2021-2022. The objectives were to determine whether composted kitchen waste would increase soil organic carbon levels and tomato yield. The BARI tomato-21 was utilized as the test crop, and the experiment was set up using a randomized complete block design (RCBD) with three replications. There were seven treatments comprising T_1 = 100 % RDCF (control), T_2=100 % RDCF + Kitchen Waste Compost @ 2.5 t ha^{-1}, T_3 = 100 % RDCF + Kitchen Waste Compost @ 5 t ha^{-1}, T_4 = 85% RDCF + Kitchen Waste Compost @ 2.5 t ha^{-1}, T_5 = 85% RDCF + Kitchen Waste Compost @ 5 t ha^{-1}, T_6 =70% RDCF + Kitchen Waste Compost @ 2.5 t ha^{-1} and T_7 = 70% RDCF + Kitchen Waste Compost @ 5 t ha^{-1}. Data revealed that, combined application of kitchen waste compost and chemical fertilizer increased tomato production as compared to sole application of chemical fertilizers. The highest average tomato fruit yield (68.46 t ha^{-1}) was found in T_3 treatment (100 % RDCF + Kitchen Waste Compost @ 5 t ha^{-1}). T_1 treatment (100 % RDCF) yielded 55.82 t ha^{-1} of tomatoes, indicating that plants could not receive enough nutrients from a single application of chemical fertilizer. On the other hand, as chemical fertilizers were reduced, tomato yield gradually declined. The T_6 treatment (70 % RD + kitchen waste compost @ 2.5 t ha^{-1}) had the lowest average tomato output, 52.73 t ha^{-1}. The T_3 treatment (100 % RDCF + kitchen waste compost @ 5 t ha^{-1}) performed better after the second cycle was finished in terms of total nutrient content in post-harvest soil. In comparison to previous treatments, this treatment also increased soil carbon accumulation. As a result, it is practicable to apply the full dose of chemical fertilizer with 5 t ha^{-1} kitchen waste compost, which will boost tomato yields, bring about economic benefits and prevent soil and environmental contamination.

KEYWORDS

Kitchen Waste Compost, Chemical Fertilizer, Tomato, Carbon Accumulation and Yield.

1. INTRODUCTION

To increase production in agricultural systems, farmers have taken up the practice of employing massive applications of chemical fertilizers and pesticides. The use of several chemicals, however, can have a negative influence on the environment, production, and quality, as is currently becoming evident. (Piqueres et al., 2005). The development of farming practices that are efficient in terms of energy use, ecologically responsible in terms of waste management, and conserving natural resources like soil and water will ultimately ensure the safety and quality of the food produced. The term "kitchen waste" refers to organic leftovers from restaurants, hotels and households (Li et al., 2009). Food waste, raw meat, fish, and eggs are just a few of the items that kitchens produce that cannot be disposed of in landfills. In its metropolitan areas, Bangladesh is predicted to have produced 23,688 tons of solid garbage per day in 2014, and by 2025, that number is expected to rise to 47,000 tons (Bangladesh Waste Database, 2014). The majority of food waste has been dumped in landfills with other waste, which has led to a number of issues including odor, vermin attraction, harmful gas emissions, leachate contamination of groundwater, and loss of landfill capacity (Shin et al., 2001). Global warming is caused by the release of methane (CH_4) and carbon dioxide (CO_2) into the atmosphere as a result of microbial activity in unmanaged anaerobic conditions at landfills (Parawira, 2004).

To lessen the volume of solid waste going to the landfill, composting is a smart idea. Composting is a controlled decomposition where natural breakdown process occurs. Composting yields organic fertilizers as its final result. This final product, which is rich in carbon and nitrogen, is utilized as a soil conditioner and fertilizer in landscaping, horticulture, and agriculture (Sambali and Mehrotra, 2009). Organic fertilizers are essential in the agricultural sector since they improve soil without harming plants or ground water (Min, 2015). When applied repeatedly over time, mineral fertilizers change the physical characteristics of the soil and may make it difficult to increase yields. Technologies that combine mineral fertilizers with organic nutrient sources may be preferable in these situations in order to improve fertilizer use efficiency and offer a balanced supply of nutrients. The current study was conducted since there is limited information on the combined use of compost made from kitchen waste and inorganic fertilizers on tomato production. The goal of the study was to investigate the potential for bioconversion of kitchen wastes into fertilizer, which could help to increase yield and restore soil fertility for long-term crop production.

Quick Response Code	Access this article online	
	Website: www.jwbm.com.my	**DOI:** 10.26480/jwbm.02.2022.78.82

Cite the Article: M. Yasmin, M.S. Rahman, M.A. Rahman, J. Rahman, F.S. Shikha, R. Sultana (2022). Effect of Kitchen Waste Compost on Tomato Yield and Carbon Accumulation in Soil. *Journal of Wastes and Biomass Management, 4(2): 78-82.*

2. Materials and Methods

The study was conducted at the research field of Regional Agricultural Research Station (RARS), under Jamalpur district in Bangladesh using tomato variety BARI tomato-21. The experiment was carried out in rabi season of 2020-2021 and 2021-2022.The site belongs to AEZ- 9(Old Brahmaputra Floodplain), 24°56′11′′N latitude and 89°55′54′′E longitude and an altitude of 16.46m. The soil of the experimental site was silt clay loam in texture. The initial soil sample of the experimental field was collected from a depth of 0-15 cm and analyzed following standard methods. Nutrient status of initial soil is presented in Table 1.

Table 1: Chemical properties of experimental soil (initial) at RARS, Jamalpur

Location	pH	OM (%)	Ca	Mg	K	Total N%	P	S	B	Cu	Fe	Mn	Zn
			meq 100g^{-1}				µg g^{-1}						
RARS, Jamalpur	7.1	1.34	6.0	1.9	0.092	0.041	8.7	7.5	0.35	2.6	25	4.0	1.2
Critical level	-	-	2.0	0.5	0.12	-	10	10	0.20	0.2	4	1	0.6

The experiment was set up using a three-replication randomized complete block design (RCBD). The unit plot was 3 m by 2 m. The 30 days old tomato seedlings were transplanted on 23 November, 2021 in a spacing of 60cm x 45cm.Recommended doses of chemical fertilizer for tomato were calculated on the basis of soil test values according to fertilizer recommendation guide.

Treatments were as follows:

T_1 = 100 % RDCF (control)

T_2 = 100 % RDCF + Kitchen Waste Compost @ 2.5 t ha^{-1}

T_3 = 100 % RDCF + Kitchen Waste Compost @ 5 t ha^{-1}

T_4 = 85% RDCF + Kitchen Waste Compost @ 2.5 t ha^{-1}

T_5 = 85% RDCF + Kitchen Waste Compost @ 5 t ha^{-1}

T_6 = 70% RDCF + Kitchen Waste Compost @ 2.5 t ha^{-1}

T_7 = 70% RDCF + Kitchen Waste Compost @ 5 t ha^{-1}

Blanket dose: N_{150} P_{38} K_{50} S_{20} Zn_2 B_1 Kg ha^{-1} (FRG-2018)

Table 2: Treatments combinations for tomato crop

Treatments	**Treatment combination**						
	Chemical Fertilizer (kg ha^{-1})						**Organic Manure (t ha^{-1})**
	N	P	K	S	Zn	B	Kitchen Waste Compost
T_1	150	38	50	20	2	1	0
T_2	142	29	38	20	2	1	2.5
T_3	134	20	26	20	2	1	5
T_4	120	24	31	20	2	1	2.5
T_5	112	15	19	20	2	1	5
T_6	97	18	23	20	2	1	2.5
T_7	89	9	11	20	2	1	5

Note: T_1 =100 % RDCF (control), T_2 = 100 % RDCF + KWC @ 2.5 t ha^{-1},T_3= 100 % RDCF + KWC @ 5 t ha^{-1} T_4 = 85% RDCF + KWC @ 2.5 t ha^{-1} , T_5 = 85% RDCF + KWC @ 5 t ha^{-1} ,T_6 = 70% RDCF + KWC @ 2.5 t ha^{-1} and T_7 = 70% RDCF + KWC @ 5 t ha^{-1}

2.1 Preparation of Kitchen Waste Compost (KWC)

2.1.1 Composting material

Greens (rich in nitrogen) and browns (high in carbon) are required as the primary source of the composting materials in the composting process. They were previously referred to as sources of nitrogen and carbon. Kitchen trash is referred to as "greens," but dried leaves, sawdust, shredded paper, and soil are considered "browns." Household kitchen waste is gathered, air dried, and ground into little bits. To achieve uniformity, this ground waste material is combined with brown in a suitable ratio (1:1 by volume, which translates to 1:3 by weight). Based on the weight percentages of the component wastes in the combination, the C/N ratio is determined.

2.1.2 Design of composting drums

The composting process was carried out in plastic container that had been modified appropriately to allow for air circulation by adding six layers of 10 mm holes spaced evenly around the circumference.

2.1.3 Composting Method

Basically, the composting was done layer by layer. In the container, the browns and greens were alternately placed. After that, it was rotated to mix the ingredients and reduce their size.

Step 1: A substantial layer of brown materials, such as dirt and shredded newspaper, was spread on the bottom of the compost bin. These aid in increasing aeration and soaking up extra moisture.

Step 2: The composter received the prepared greens. Above the browns that were added in step 1, they need to form a layer.

Step 3: The composter received a few handfuls of compost starters. After then, they were combined with the greens that had been added before.

Step 4: The composter received a fresh layer of shred browns. Browns were added about in the same quantity as step 2's greens. The greens and compost starters from the previous phase were then combined with this new layer. By adding air spaces, this ensures an aerobic environment and a successful composting process. Additionally, it shields the compost pile from bugs and odors.

After layering everything, some water was put to the composter along with some turmeric powder to deter ants. Direct sunlight should be kept away from the composter since it will cause the microorganisms to die. The materials' moisture content was kept between 60 and 70 percent. To obtain the final composted material, the composter was then rotated every three days for mixing and aeration purposes and remoistened for adequate microbial activity.

Table 3: Chemical composition of kitchen waste compost (KWC) used for the experiment

Name of the manure	pH	OC %	Ca	Mg	K	Total N %	P	S	B	Cu	Fe	Zn
			meq 100g^{-1}				µg g^{-1}					
Kitchen waste compost (KWC)	7.9	22.0	7.50	3.65	0.51	0.31	0.36	1.42	0.01	0.04	0.57	0.09

Other intercultural operations were done as per requirement.The crop harvesting continued during the month of March to April, 2022. Data on yield and yield contributing characters were recorded and analyzed statistically using statistical software STAR which was developed by IRRI. Least significant differences (LSD) were used for means separation at 5% probability level. Carbon stock and Carbon accumulation were calculated using following formula.

Carbon stock (t ha^{-1}) = Carbon concentration (%) x bulk density (gcc^{-1}) x depth (cm)

Carbon accumulation (t ha^{-1}) = Final carbon stock (t ha^{-1}) - Initial carbon stock (t ha^{-1})

3. Results and Discussion

3.1 Effect of Kitchen Waste Compost (KWC) and Chemical Fertilizer on Plant Growth and Yield of Tomato

Table 4 provides a summary of the data regarding tomato yield and yield contributing factors as affected by various treatments. The growth and yield of tomato were greatly boosted by the combined application of inorganic fertilizers and compost made from kitchen waste. The highest plant height of 101.21 cm was recorded in the treatment T_3 where 100% chemical fertilizer + kitchen waste compost @ 5 t ha^{-1} was used. Significantly shortest plant highest of 89.59 cm was found in sole chemical fertilizer treatment. Compost made from kitchen garbage and inorganic fertilizers was found to improve tomato crop performance. Application of compost and inorganic fertilizer statistically influenced the fruit length and fruit diameter. Fruit length and fruit diameter were increased from 5.04 cm to 5.78 cm and 4.09 cm to 4.51 cm, respectively due to different treatments. Number of fruits per plant was found highest (41.59) in T_3 treatment (100% RDCF + KWC @ 5 t ha^{-1}) which was statistically at par with T_2 treatment (100% RDCF + KWC @ 2.5 t ha^{-1}). Average fruit weight per plant was also highest (2.02 kg) in T_3 treatment which was statistically similar with T_2 treatment (100% RDCF + KWC @ 2.5 t ha^{-1}) and these values were found lowest in T_6 treatment (70% RDCF + KWC @ 2.5 t ha^{-1}).

The single application and combination application of kitchen waste compost and fertilizers had a substantial impact on the fruit production of BARI tomato 21(Table 4). In 2021-2022, the highest tomato yield of 66.04 t ha^{-1} was obtained in the treatment T_3 (100% RDCF + KWC @ 5 t ha^{-1}) which was statistically identical to T_2 (100% RDCF + KWC @ 2.5 t ha^{-1}). When compost made from kitchen waste and commercial fertilizers were combined, tomato crop performance improved. These findings were in agreement with those of Ogundare et al. (2015), who claimed that maximum nutrient availability as a result of integrated usage of organic and inorganic fertilizers increased nutrient uptake by the plant, which in turn led to dry matter production and tomato fruit output. Among all the treatments, T_3 (100% RDCF + KWC @ 5 t ha^{-1}) exhibited the maximum increase in tomato yield which was 19.44 % higher over sole chemical fertilizer treatment. T_1 treatment (100 %RDCF) generated a tomato yield of 55.29 t ha^{-1}, which was lower than T_3 and T_2, demonstrating that inorganic fertilizer application was insufficient to provide plants with appropriate nutrients. As the amount of inorganic fertilizers dropped, tomato yield gradually declined. The T_6 treatment (70 % RDCF + compost @ 2.5 t ha^{-1}) had the lowest fruit output, 52.40 t ha^{-1}.

Table 4: Effects of chemical fertilizer and kitchen waste compost (KWC) on tomato yield and yield components

Treat	Plant Height	Fruit Length	Fruit Diameter	Fruit no. plant^{-1}	Ave. fruit wt. plant^{-1} (kg)	Tomato Yield (t ha^{-1})		Average Yield (t ha^{-1})
	(cm)					2020-21	2021-22	
T_1	89.59 e	5.04 ab	4.27 b	28.46 d	1.16 d	56.35 e	55.29 d	55.82
T_2	98.27 b	5.78 a	4.44 a	41.29 a	1.86 ab	69.13 b	65.74 a	67.44
T_3	101.21 a	5.77 a	4.51a	41.59 a	2.02 a	70.87 a	66.04 a	68.46
T_4	91.05 cd	5.43 cd	4.25 bc	30.67 c	1.63 c	65.05 c	57.47 c	61.26
T_5	92.07 c	5.50 bc	4.27 b	32.19 b	1.71 bc	64.28 d	60.49 b	63.39
T_6	90.33 de	5.28 d	4.13 cd	25.23 f	0.99 d	53.06 g	52.40 e	52.73
T_7	91.01 d	5.35 cd	4.09 d	27.29 e	1.18 d	54.34 f	53.27 e	53.81
CV%	7.01	5.19	5.23	9.78	10.59	11.45	13.75	-
LSD (0.05)	1.04	0.09	0.13	1.08	0.19	1.20	1.80	-

Means in a column followed by same letter(s) do not differ significantly at 5% level by LSD.

Note: T_1 =100 % RDCF (control), T_2 = 100 % RDCF + KWC @ 2.5 t ha^{-1},T_3= 100 % RDCF + KWC @ 5 t ha^{-1} T_4 = 85% RDCF + KWC @ 2.5 t ha^{-1} , T_5 = 85% RDCF + KWC @ 5 t ha^{-1} ,T_6 = 70% RDCF + KWC @ 2.5 t ha^{-1} and T_7 = 70% RDCF + KWC @ 5 t ha^{-1}

3.2 Nutrient Status of Post-Harvest Soil

After two years, post-harvest soil was tested, and it was discovered that an integrated application of composted kitchen waste and inorganic fertilizers had dramatically improved soil nutritional status compared to the control. Different treatments had an impact on the pH of the post-harvest soil, which ranged from 7.1 to 7.6. (Table 5). The release of organic acid from extra organic manure may account for the maximum pH value (7.6) reported from the combined application of KWC @ 5 t ha^{-1} + 100% RDCF fertilizer treatment, while the minimum pH value (7.1) was obtained in the 100% RDCF treatment. Soil Organic carbon varies from 0.77% to 0.86%. Maximum organic carbon (0.86%) was found from KWC @ 5 t ha^{-1} + 100% RDCF treatment and minimum (0.77%) in control treatment. On the other hand, treatments where kitchen waste compost was applied resulted in higher soil organic matter. The mix of organic manure and chemical sources enhanced the amount of organic matter in the soil, according to research (Islam et al., 2013; Manoj et al., 2012). The available N content of the soil increased by about 54.76 % under T_3 (kitchen waste compost @ 5 t ha^{-1} + 100% RDCF) treatment compared to control. A group researchers concluded a rise in the total N content of the soil caused by integrated fertilizer use (Wiqar et al., 2013). Similarly, remarkable increases of approximately 118.91 % and 62.5 % in the T_3 compared to the control were found for P and K, respectively. In treatments where compost made from kitchen trash was treated, the status of other soil nutrients was greater. Contrarily, the control treatment, which used just chemical fertilizers, had lower nutritional status.

Table 5: Effect of kitchen waste compost application on nutrient status of post harvest soil, 2021-2022

Treatments	pH	SOM (%)	SOC (%)	Total N (%)	K meq 100g^{-1}	P	S	B	Zn
						µg g^{-1}			
T_1	7.1	1.32	0.77	0.042	0.16	7.4	18.6	0.33	1.3
T_2	7.6	1.46	0.85	0.058	0.24	14.5	25.1	0.43	2.0
T_3	7.6	1.47	0.86	0.065	0.26	16.2	25.6	0.48	2.1
T_4	7.3	1.41	0.82	0.052	0.23	13.8	18.9	0.41	1.5
T_5	7.4	1.42	0.83	0.054	0.23	14.1	19.4	0.39	1.7
T_6	7.2	1.34	0.78	0.032	0.18	6.1	16.3	0.29	1.2
T_7	7.2	1.35	0.79	0.032	0.17	6.4	16.5	0.27	0.9
Initial soil	7.1	1.34	0.78	0.041	0.092	8.7	7.5	0.35	1.2

Note: T_1 = 100 % RDCF (control), T_2 = 100 % RDCF + KWC @ 2.5 t ha^{-1},T_3 = 100 % RDCF + KWC @ 5 t ha^{-1} T_4 = 85% RDCF + KWC @ 2.5 t ha^{-1} , T_5 = 85% RDCF + KWC @ 5 t ha^{-1} ,T_6 = 70% RDCF + KWC @ 2.5 t ha^{-1} and T_7 = 70% RDCF + KWC @ 5 t ha^{-1}

3.3 Carbon Accumulation in Soil From Different Treatment Combination

The soil quality metrics were significantly enhanced by the combined application of inorganic fertilizers and composted kitchen waste. The initial soil organic carbon, bulk density and carbon stock in soil were 0.78 %, 1.49 gcc^{-1} and 17.43 tha^{-1}, respectively. After two years, bulk density varied from 1.44-1.49 gcc^{-1}. The soil organic carbon stock and carbon accumulation values are higher recorded in T_3 (100% RDCF + KWC @ 5 t ha^{-1}) treatment (18.83, 1.40) followed by T_2 (100% RDCF + KWC @ 2.5 t ha^{-1}) treatment (18.74, 1.31) and the lower values were recorded in control (17.20, -0.23) treatment. The results showed that, compared to solitary chemical fertilizer application, integrated application of chemical fertilizers and organic manure treatments gathered the maximum carbon. According to a studies, different ecosystems, temperature regimes, and fertilization management have different carbon sequestration (West and Six, 2007).

Table 6: Carbon accumulation in soil as influenced by different treatment combination, 2021-2022

Treatments	Initial Soil			Post Harvest Soil			Carbon Accumulation (t ha^{-1})
	SOC (%)	BD (gcc^{-1})	C Stock (t ha^{-1})	SOC (%)	BD (gcc^{-1})	C Stock (t ha^{-1})	
T_1	0.78	1.49	17.43	0.77	1.49	17.20	- 0.23
T_2	0.78	1.49	17.43	0.85	1.47	18.74	1.31
T_3	0.78	1.49	17.43	0.86	1.46	18.83	1.40
T_4	0.78	1.49	17.43	0.82	1.45	17.83	0.40
T_5	0.78	1.49	17.43	0.83	1.46	18.17	0.74
T_6	0.78	1.49	17.43	0.78	1.44	16.84	- 0.59
T_7	0.78	1.49	17.43	0.79	1.44	17.06	- 0.37

Note: T_1 = 100 % RDCF (control), T_2 = 100 % RDCF + KWC @ 2.5 t ha^{-1},T_3 = 100 % RDCF + KWC @ 5 t ha^{-1} T_4 = 85% RDCF + KWC @ 2.5 t ha^{-1} , T_5 = 85% RDCF + KWC @ 5 t ha^{-1} ,T_6 = 70% RDCF + KWC @ 2.5 t ha^{-1} and T_7 = 70% RDCF + KWC @ 5 t ha^{-1}

3.3 Cost and Return Analysis

Table 7 details the economic outcomes of tomato production as influenced by the combined application of chemical fertilizer and composted kitchen waste. The T_3 treatment (100 % RDCF + KWC @ 5 t ha-^{1}) produced the highest gross return (Tk 1026900 ha^{-1}), gross margin (Tk 783800 ha^{-1}) and BCR (4.22) measurements. The second greatest results for the aforementioned parameters came from the T_2 treatment (100 % RDCF + KWC @ 2.5 t ha^{-1}). The T_6 treatment (70 % RDCF + KWC @ 2.5 t ha^{-1}) had the lowest gross return (Tk 790950 ha^{-1}), gross margin (Tk 562550 ha^{-1}) and BCR (3.46), of all the treatments.

Table 7: Cost and return analysis of tomato production as influenced by different treatment combination, 2021-2022

Treatments	Average Tomato Yield (t ha^{-1})	Gross Return	Total Variable Cost	Gross Margin	BCR
		(Tk ha^{-1})			
T_1	55.82	837300	237500	599800	3.50
T_2	67.44	1011600	241000	770600	4.19
T_3	68.46	1026900	243100	783800	4.22
T_4	61.26	918900	233000	685900	3.94
T_5	63.39	950850	235700	715150	4.03
T_6	52.73	790950	228400	562550	3.46
T_7	53.81	807150	230800	576350	3.49

Note: T_1 = 100 % RDCF (control), T_2 = 100 % RDCF + KWC @ 2.5 t ha^{-1},T_3 = 100 % RDCF + KWC @ 5 t ha^{-1} T_4 = 85% RDCF + KWC @ 2.5 t ha^{-1} , T_5 = 85% RDCF + KWC @ 5 t ha^{-1} ,T_6 = 70% RDCF + KWC @ 2.5 t ha^{-1} and T_7 = 70% RDCF + KWC @ 5 t ha^{-1}

Unit pricing (Tk.Kg^{-1}): Input: Urea=16, TSP= 22, MoP = 15, Gypsum = 12, Zinc sulphate = 200, Boric acid = 250, Kitchen waste compost =10 Output: Average tomato price is 15 Tk Kg^{-1}, with prices ranging from 10 to 25 Tk Kg^{-1}.

4. Conclusion

Utilizing a composting system to manage kitchen waste can result in nutrient-rich organic fertilizer that is valuable. It is now necessary to spread information about composting kitchen garbage in order to improve the environment's cleanliness, greenness, health, and friendliness. Final results showed that the most effective treatment package for enhancing tomato output and promoting soil carbon buildup was composed of 100% chemical fertilizer with kitchen waste compost @ 5 t ha^{-1}. This approach was appropriate and practical from an economic standpoint. Therefore, it can be concluded that using this combination (100 % chemical fertilizer + kitchen waste compost @ 5 tha^{-1}) may be suggested for tomato cultivation in the Jamalpur region (AEZ 9).

References

Bangladesh Waste Database. 2014. Waste Concern Technical Report Series, Pp. 7.

Islam, M.R., Chowdhury, M.A.H., Saha, B.K., and Hasan, M.M., 2013. Integrated nutrient management on soil fertility, growth, and yield of Tomato. J. Bangladesh Agril. Univ., 11 (1), Pp. 33–40.

Li. R., Chen, S., Li, X., Lar, J.S., He, Y., and Zhu, B., 2009. Anaerobic Codi gestion of Kitchen Waste with Cattle Manure for Biogas Production. Energy and Fuels, 23, Pp. 2225-2228.

Manoj, K., Baishaya, L.K., Ghosh, D.C., Gupta, V.K., Dubey, S.K., Anup, D.D., and Patel, P., 2012. Productivity and Soil Health of Potato (Solanum tuberosum L.) as Influenced by Organic Manures, Inorganic Fertilizers and Biofertilizers under High Altitudes of Eastern Himalayas. J. Agric. Sci., 4 (5).

Min, T.L., 2015. Production of Fertilizer using Food Wastes of Vegetables and Fruits.

Ogundare, S.K., Babalola, T.S., Hinmikaiye, A.S., and Oloniruha, J.A., 2015. Growth and Fruit Yield of Tomato as Influenced by Combined Use of Organic and Inorganic Fertilizer in Kabba, Nigeria. European J. Agric. Forestry Res., 3 (3), Pp. 48-56.

Parawira, W., 2004. Anaerobic Treatment of Agricultural Residues and Wastewater Application of High-Rate Reactors, Department of Biotechnology, Lund University, Pp. 3.

Piqueres, P.A., Edel-Hermann, V., Alabouvette, C., and Steinber, C., 2005. Response of soil microbial communities to compost amendments. Soil Biol Biochem., 38, Pp. 460-470.

Sambali, G., and Mehrotra, R.S., 2009. Principles of microbiology.New Delhi: Tata McGraw-Hill Education Pvt. Ltd.

Shin, H.S., Han, S.K., Song, Y.C., and Lee, C.Y., 2001. Performance of UASB reactor treating leachate from acidogenic fermenter in the two-phase anaerobic digestion of food waste. Water Res., 35 (14), Pp. 3441–3447.

West, T.O., and Six, J., 2007. Considering the influence of sequestration duration and carbon saturation on estimates of soil carbon capacity. J. of climate change., 80 (1), Pp. 25-41.

Wiqar, A., Zahir, S., Farmanullah, K., Shamsher, A., and Wasiullah, M., 2013. Maize yield and soil properties as influenced by integrated use of organic, inorganic and bio-fertilizers in a low fertility soil. Soil Environ., 32 (2), Pp. 121-129.

Cite the Article: M. Yasmin, M.S. Rahman, M.A. Rahman, J. Rahman, F.S. Shikha, R. Sultana (2022). Effect of Kitchen Waste Compost on Tomato Yield and Carbon Accumulation in Soil. *Journal of Wastes and Biomass Management, 4(2): 78-82.*