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Abstract. Organic waste and sewage sludge were becoming big problems in urban area. Community who live in the city have to buy soil media and compost for farming activities. This study was aimed to determine the effect of utilising sewage sludge and urban organic waste compost for cultivating onion using urban farming system. The experiment factors were sewage sludge and dosage of urban organic waste compost. The results showed that there was no correlation between the both treatment factors. Besides, there was no significant difference for all experimental variables: the treatment of sewage sludge and garden soil as comparisons. Meanwhile, the treatment of urban waste compost dosage had a significant effect on the height of the onion plant, the weight of the harvest, the number of bulbs, and the dry weight of onion. In addition, the treatment of urban waste compost as much as 10%, 20% and 30% was not significantly different from each other. For plants that were given urban waste compost, the plant height was 36-38 cm, harvest weight was 75-92 g/plant, the number of bulbs was 10-12 fruits/plant and the dry weight of onion was 50-60 g/plant.

1. Introduction

Onion (*Allium ascalonicum* L.) is a high value vegetable crop; it is the same as the other food commodity that has high nutritional content, so that it becomes one of the food needs. The content of essential oils in the bulbs is used as a flavoring food, bactericides, fungicides, and efficacious as traditional medicines, such as reducing fever for children [1].

The organic onion cultivation in environmentally friendly is one of the solutions of the hazard of chemical fertilizer and excessive synthetic pesticides in long-term use [2]. Here, organic agriculture emerges an alternative of modern agriculture by relying on natural materials and avoiding the synthetic materials for both fertilizers and pesticides [3].

In urban area, waste becomes big problems. The first is the potential of very high organic waste especially in cities with the dense populations [4]. As an illustration, in a city with the population of 1 million, the landfill is approximately equivalent to 500 tons/ per day. In addition, many innovations for household solid waste management have never been adopted because they do not take into account the existency of local knowledge, preferences, behaviors, and management practices [5]. The organic waste is generally biodegradable; it can be broken down into simple compound by the activity of soil

microorganisms. The decomposition of organic waste will produce materials containing rich nutrients needed by plants, so that it can be utilized as organic fertilizer in agricultural activities [6].

The other problem experienced in coastal cities or those that have a relatively flat topography is sewage sludge or river. Moreover, the deforestation in upstream area causes erosion. As a result, the river becomes dirty because the water brings very soft soil particles. In downstream area, especially in sloping area, the flow of water is slow. In addition, the large amount of urban waste and water plants, such as water hyacinth blocking the rivers' flow. This causes the deposition of materials carried by water causing the sludge on river and drainage. In fact, the sewage sludge can be used as organic fertilizer. Further, the sewage sludge and mud of the pond have been developed as planting media on vertical agriculture [7]. However, the continuing use can cause imbalance on soil fertility as well as soil-water-plant system contamination [8].

The study was aimed to determine the response of onion plants cultivated on sediment soil of wastewater in urban area by adding compost from urban organic waste. The results of the research become a reference of recommendation for goverment and community to the utilization of wastewater normalization and organic waste biomass as the major problems in urban area.

2. Materials and Methods

2.1. Materials

Seeds of onion (Tajuk variety) were bought from farmers of onion in Nganjuk Regency. The seeds were selected by choosing the same size of bulb, the dry outer layer skin and if the seeds are cleaned, it can be obtained the red seeds with clean, shiny skin, full seeds (undamaged seeds). The seeds needed in this research were 180 seeds with a backup of seeds 20% so that the amount of prepared seeds is 215 seeds. Approximately one third of the tip of the selected seeds was cutted and then planted at polybag prepared.

Water sediment soil was obtained from sewage sludge stabilized on river, reservoir, highway and household drainages in Surabaya. Water sediment soil was dried and then scarified. Garden soil was bought from plant shops in Surabaya. Garden soil was the topsoil of farming field coming from Mojokerto Regency. Water sediment soil and garden soil which have been scarified were ready to use in the experiment.

Urban organic waste compost was obtained from composting mixed of dry and wet wastes with the addition of EM4. After incubated for 60 days (2 months), the composting bag was opened and left it open for 2 weeks, and then the compost was ready to use.

2.2. Methods

The study was carried out in November 2017 to March 2018 at Experimental Garden of Universitas Wijaya Kusuma Surabaya. A randomized block design with two factors was employed in this research. The first factor was the source of sedimentary soil consisting of river sediment soil, reservoir sediment soil, highway drainage sediment soil, residential sewage sediment soil, and garden soil as the comparison. The second factor was the percentage of urban waste biomass weight added to the watershed soil media consisting of control (0.0%), 10.0%, 20.0%, and 30.0%. Twenty treatment combinations were obtained and carried out in triplicate. Furthermore, the size of polybag used was 40 cm in diameter and 40 cm in height, filled with the media up to 2/3 volume and planted with one onion seed bulb.

2.3. Observation and data analysis

The growth variables consisted of the plant lengths, number of leaves, and number of onion's bulbs. Meanwhile, the production variables consisted of the weight of harvested onion, the dried weight of onion, and the number of bulbs per plant. Data of the study were analyzed by using variance analysis, and the F test showed the significant differences, it was tested by using the Least Significant Difference (LSD) test of 5%.

3. Results and Discussion

3.1. Plant lengths

The lengths of the plants were observed starting at 7 days after planting and measuring from the root neck to the longest leaf tip. The observation was carried out up to the plants were at 63 days, or one week before harvesting. The average value of the plant lengths for each observation is presented in Table 1.

Table 1. The average length of onion (*Allium ascalonicum* L) using various media treatment of soil sediment and dosage of urban waste compost.

Treatment	The average length of onion (cm) of aged plants (Days after planting/DAP)								
	7	14	21	28	35	42	49	56	63
T_1	9.25	23.00	31.08	33.17	35.42	34.92	35.92	35.00	35.42
T_2	7.83	22.17	31.00	33.42	35.67	35.67	37.58	36.67	35.83
T_3	8.33	24.67	33.08	34.25	36.42	35.67	37.67	37.33	37.58
T_4	9.67	24.17	31.50	33.25	35.83	35.25	36.92	36.92	36.83
T_5	8.92	24.00	32.92	34.67	36.25	35.08	37.00	35.42	35.92
LSD 5%	NS	NS	NS	NS	NS	NS	NS	NS	NS
B_0	8.13	23.00	31.27	32.27	33.53^b	31.80^b	33.80^b	33.00^b	32.93^b
B_1	9.07	24.33	31.60	33.87	36.20^a	35.80^a	37.67^a	37.13^a	37.27^a
B_2	8.87	24.13	32.80	35.33	37.93^a	37.60^a	38.67^a	38.07^a	38.20^a
B_3	9.13	22.93	32.00	33.53	36.00^a	36.07^a	37.93^a	36.87^a	36.87^a
LSD 5%	NS	NS	NS	NS	2.10	2.55	2.77	3.24	3.36

Note: The numbers followed by the same letter were not significantly different from the 5% LSD'S test

T_1 (river sediment soil)
T_2 (reservoir sediment soils)
T_3 (road sewer sediment)
T_4 (residential sediment soils)
T_5 (garden soil as comparison)

B_0 (0% Waste Compost)
B_1 (10% Waste Compost)
B_2 (20% Waste Compost)
B_3 (30% Waste Compost)

The results of the data analysis of variance lengths of plants showed that there was no correlation between the treatment factor of sedimentary soil types and the dosage of urban waste compost. In the first treatment factor of sediment soil type, there was no significant difference between the treatments. In second treatment factor was urban waste compost dosage. It showed the significant differences starting from 35 days planted plants, possibly because the organic composition from B_1, B_2, and B_3 treatments was different from that of B_0 (without compost). Organic fertilizer can reduce soil bulk density causing the soil to become lighter so that it provides good conditions for root development and effects on plant growth and crops [9]. Another study has reported that onion length is significantly affected by organic changes [10].

3.2. Number of leaves

The number of leaves observed starting from 7 days after planting. Here, the leaves had grown perfectly and were still green counted. The observation was carried out up to 63 days, or one week before harvesting. The average number of leaves for each observation is presented in Table 2.

The results of the data analysis of variance in the number of leaves showed that there was no correlation between the factors of treatment of sedimentary soil types and the dosage of urban waste compost. In the first factor treatment of sediment soil type there was no significant difference between treatments. In addition, the second factor treatment of urban waste compost dosage, i.e. the results of giving compost B_1, B_2, and B_3 were significantly different from B_0 (without compost) in plants aged 28

days and 42 days with a disparity of 8-10 leaves. The number of leaves at 42 days was the highest, after in which they decreased because they began to return yellow. Onion number of leaves is significantly affected by organic changes [10].

Table 2. The average amount of onion (*Allium ascalonicum* L) plant leaves using various media treatment of sediment soil and dosage of urban waste compost.

Treatment	The average number of leaves in aged plants (Days after planting/DAP)								
	7	14	21	28	35	42	49	56	63
T_1	11.00	17.92	19.33	25.33	27.25	30.92	31.67	25.42	25.08
T_2	10.00	17.58	18.33	24.17	28.00	31.25	31.00	22.83	22.58
T_3	10.42	17.67	18.17	24.25	27.75	30.83	30.58	23.75	22.92
T_4	10.25	17.92	18.58	22.42	27.33	29.58	29.92	30.00	29.42
T_5	10.92	18.58	19.58	24.83	26.42	29.17	30.00	22.00	21.50
LSD 5%	NS	NS	NS	NS	NS	NS	NS	NS	NS
B_0	10.47	16.87	17.67	21.47c	24.13	23.47b	23.93b	21.00	20.33
B_1	10.67	18.60	19.73	26.47a	28.67	33.27a	33.33a	25.33	24.93
B_2	10.73	18.73	19.87	25.87ab	30.60	33.40a	33.73a	27.93	27.40
B_3	10.20	17.53	17.93	23.00bc	26.00	31.27a	31.53a	24.93	24.53
LSD 5%	NS	NS	NS	3.26	NS	4.84	3.44	NS	NS

Note: The numbers followed by the same letter are not significantly different from the 5% LSD'S test

T_1 (river sediment soil)
T_2 (reservoir sediment soils)
T_3 (road sewer sediment)
T_4 (residential sediment soils)
T_5 (garden soil as comparison)

B_0 (0% Waste Compost)
B_1 (10% Waste Compost)
B_2 (20% Waste Compost)
B_3 (30% Waste Compost)

3.3. Number of onion's bulbs

The number of bulbs was observed when the plants were at 35 days, there were several growing points appearing as bulbs so that they became a clump of plants. The observation of the number of bulbs was carried out up to the plants were at 63 days, or one week before harvesting. The average number of bulbs for each observation is presented in Table 3.

The results of the data analysis of variance in the number of bulbs showed that there was no correlation between the factors of treatment of sedimentary soil types and dosage of urban waste compost. In first factor treatment of sedimentary soil type and the dosage of urban waste compost also had no significant effect on the number of bulbs. The number of bulbs of onion plants ranged from 7 to 10. This was in line with previous research which showed that the treatment of various types of organic ingredients (cow manure, azolla compost, and biomass compost) have no significant effect on the number of onion's bulbs [11]. Furthermore, another study also proved that the organic ingredients (straw compost, city waste compost, empty bunches of oil palm, and palm oil industry sludge) had no significant effect on the number of onion bulbs [12]. Meanwhile, onion bulb diameter was significantly influenced by organic changes [10].

Table 3. The average number of onion bulbs (*Allium ascalonicum* L) and plants using various media treatment of soil sediment and dosage of urban waste compost.

Treatment	The average number of onion's bulbs in aged plants (Days after planting/DAP)				
	35	42	49	56	63
T_1 (river sediment soil)	8.17	8.50	8.42	9.67	8.58
T_2 (reservoir sediment soils)	7.83	8.42	8.08	8.50	8.58
T_3 (road sewer sediment)	7.58	8.17	8.50	9.08	9.08
T_4 (residential sediment soils)	7.67	7.92	8.25	8.33	8.75
T_5 (garden soil as comparison)	8.00	8.08	8.08	8.92	9.08
And LSD 5%	NS	NS	NS	NS	NS
B_0 (0% Waste Compost)	7.20	7.60	7.73	8.87	8.40
B_1 (10% Waste Compost)	8.20	9.07	9.07	9.40	9.27
B_2 (20% Waste Compost)	8.33	8.47	8.47	9.07	9.20
B_3 (30% Waste Compost)	7.67	7.73	7.80	8.27	8.40
LSD 5%	NS	NS	NS	NS	NS

Note: The numbers followed by the same letter were not significantly different from the 5% LSD'S test

3.4. Onion crops

This variable included the fresh weight of bulbs at harvest time, the number of bulbs and the dried weight of onion (after 3-day drying process). The average value of the single factor treatment for each variable is presented in Table 4.

Table 4. The average of onion (*Allium ascalonicum* L.) crop variable (per plant) using various media treatment of sediment soil and dosage of urban waste compost.

Treatment	The weight of bulbs at harvest time (g)	The number of bulbs	The dry weight of bulbs (g)
T_1 (river sediment soil)	68.42	10.67	44.51
T_2 (reservoir sediment soils)	83.20	10.58	56.02
T_3 (road sewer sediment)	77.08	11.00	48.36
T_4 (residential sediment soils)	67.67	9.83	43.98
T_5 (garden soil as comparison)	70.13	10.08	44.05
LSD 5%	NS	NS	NS
B_0 (0% Waste Compost)	45.84 c	9.07 b	28.61 c
B_1 (10% Waste Compost)	80.59 ab	10.60 a	53.00 ab
B_2 (20% Waste Compost)	91.13 a	11.67 a	60.54 a
B_3 (30% Waste Compost)	75.64 b	10.40 ab	47.38 b
LSD 5%	13.30	1.39	8.62

Note: The numbers followed by the same letter were not significantly different from the 5% LSD'S test

The results of variance analysis on onion crops showed that there was no correlation between the treatment factors of the sediment soil types and the dosage of urban waste compost for all observation variables. Moreover, the treatment of river sediment soil, reservoir sediment soil, highway drainage sediment soil, residential sewage sediment soil, and garden soil as the comparison showed that there were no significant differences for all variables of onion crops.

The treatment of urban waste compost dosage showed that there was significant difference for the 3 variables of onion crops, and the best result was the provision of urban waste compost at a dosage of 10-20%. The highest fresh weight of bulbs was 91.13g in B_2 treatment (20% waste compost), the

highest number of bulbs was 11.67 in B_2 treatment (20% waste compost), and the dry weight of bulbs was 60.54g in B_2 treatment (20% waste compost). This was possibly that the addition of soil compost which would provide the organic nutrients needed by the onion plants to grow better. The provision of various composts in the cultivation of onions can increase the size of bulbs and onion crops [13]. Here, the organic substances added to the soil undergoes a decomposition process and produces organic materials which act as "adhesive" in the process of soil aggregation. Humus had a functional group that was negatively charged and could bind to soil particles that were positively charged. Such combination induced the formation of soil aggregates and then made the soil aggregates to became a more stable organic fertilizer, which had a greater effect on the agronomy and crop performance of onion [10, 14]. The treatment of organic fertilizer mixed between cow manure and agricultural waste had a significant effect in increasing onion growth and crops [15].

4. Conclusion

The combination of the treatment of sediment soil types and the treatment of urban waste compost did not show any interaction. The treatment of sedimentary soil types and garden soil as the comparison has also no significant difference for all experimental variables. While, the treatment of urban waste composting gave a significant effect on the height of onion, and the variables of production (harvest weight, number of bulbs, and dry weight of consumption). The sedimentary soil can replace the garden soil as medium for onion plants. Finally, for onion cultivation, it is necessary to provide urban waste compost at dosage of 10% of the soil media weight.

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