ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

The Utilization of Sediment Mud In Water Channel And Urban Organic Compost Waste For Sunflower (*Helianthus Anuus L.Var. Early Russian*) Cultivation

Dwi Haryanta[1*] , Fungki Sri Rejeki[2],

[1,]Faculty of Agriculture, University of Wijaya Kusuma Surabaya

[2]Faculty of Engineering, University of Wijaya Kusuma Surabaya

[*]*Corresponding author*: dwi.haryanta@yahoo.com

ABSTRACT

This research aims to analyze the response of sunflower plants which planted in sediment mud from water channel media and urban organic compost waste. This research conducted by applying T_1: river sediment mud, T_2: pond sediment mud, T_3: highway water channel sediment mud, T_4: sediment mud of residential sewerage, and T_5: garden soil as a comparison factor. While the treatment of second factor are amount (dose) of urban organic compost waste, namely B_0: 0% compost as control, B_1: 10%, B_2: 20%, and B_3: 30% compost. The experiment using a randomized block design is repeated three times. The experimental unit is a plant in a 50 cm diameter polybag that filled by 40 cm mud as media, filled with media as high as 40 cm. There are 60 sunflower plants for experiment. The results shows that there is no interaction between the treatment factors of sediment mud in water channel with the provision of municipal compost waste for all research variables. The treatment of sediment mud in water channel including the use of garden soil as a comparison factor is not significantly affect all research variables. As the result, sediment mud in water channel could be used as a substitute for garden soil. The treatment of urban organic compost waste has a significant influence on growth variables, they are increasing plant height, leaf number, leaf size, stem diameter, flower diameter, and shortening flowering life (7 days). The treatment of urban organic compost waste does not influence toward the production variables, which include plant height, flower bunch weight, seed weight, and seed yield toward flower bunches.

***Keywords*:** Sediment Mud In Water Channel, Sunflower, Urban Organic Compost Waste

1. INTRODUCTION

The cities problem that have flat topography relatively is garbage, silt water channel, rivers, and reservoirs. Forest damage in the upstream area causes an erosion. It makes the river water becomes cloudy and carry the soft soil particles. In the downstream area, especially in sloping areas the stream of river and water channel are slowly (Crabtree, 1989). In addition, the problem that often occurs in urban areas is the amount of garbage and aquatic plants such as water hyacinth. It causes the water flows slowly and almost stop. The sedimentation of material carried by water causes siltation of the rivers, water channel, and ponds (Rahman et al., 2017).

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

The compost biomass of green plants and urban compost waste cause increasing of zinc (Zn) content in sunflower tissue, but the effect decreases in line with the level of compost maturity (Sadej and Namiotko, 2010). Provision of compost and soil sludge will increase organic matter, phosphorus, and higher productivity compared to the addition of inorganic fertilizers (Ramdani et al., 2015). The highest production of sunflower seeds is obtained from plants given organic fertilizer (compost) and 50% inorganic fertilizer dosage (Roy et al., 2001).

The mud originating from the bottom of lakes, rivers, ponds, and other water channel is periodically taken in order to improve the flow of the river and to slow down the siltation process. It is gathered around river or ponds. The sediment mud in water channel is proved containing more humus and total organic carbon (Urbaniak et al., 2017). The character of the sediment sludge waters in Surabaya is almost the same. Its contain 0.11% N-total, 6.30% organic matter, 1.05% K_2O, 2.15% P_2O_5, 1.10% sand fraction, 5.68% dust fraction, and 93.62% clay fraction. Pond sediments contain 0.13% N-total, 5.96% organic matter, 1.12% K_2O, 2.44% P_2O_5, 1.22% sand fraction, 8.65% dust fraction, and 90.13% clay fraction. Highway water channel sediments contain 0.10% N-total, 7.05% organic matter, 0.88% K_2O, 2.19% P_2O_5, 1.38% sand fraction, 7.64% dust fraction, and 90.98% clay fraction; and residential sewerage sediment containing 0.12% N-total, 6.10% organic matter, 1.09% K_2O, 2.08% P_2O_5, 1.62% sand fraction, 6.82% dust fraction, and 91.56% clay fraction (Haryanta et al., 2017). There is an anxiety about heavy metals in sediment mud is not definitely true. Providing 7 and 14 tons sediment mud per hectare on sunflower cultivation land show that there is no heavy metals such as cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), and zinc (Zn). There is only increasing nitrogen and phosphat content in the soil and there are also no heavy metals in the sunflower plant tissue (Lavado, 2006). Research on the addition of water channel mud in the growing media caused an increase in the concentration of heavy metal content Cr, Fe, Zn, and Ni. But, it was still below the tolerance threshold set by the European Society and did not cause phytotoxicity. However, it increased the growth variable and cucumber plant biomass weight (Eid et al., 2017). Utilization of urban compost mud from water channel as a media for mango plants show that no risk of metal pollutants being absorbed by plants (Chu, 2017).

Sunflower plants (*Helianthus annuus* L.) are cultivated as ornamental plants because of their beautiful flowers, have therapeutic activities in various treatments, including wound healing, antioxidants, anticancer, antidiarrheal, antihistamine, anti-inflammatory, and as analgesics (Juniarti and Herdiana, 2017). Sunflower plants can be considered as phytoremediators of soil contaminated with radionuclide Cs and have high radiosensitivity (Tjahaja and Sukmabuana, 2007), as

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

phytoremediators (absorbent) of toxic metals (Cu, Zn, Pb, Hg, As, Cd, Ni) on contaminated soil (Jadia and Fulekar, 2008 ; Baghaie1 et al., 2016).

The aim of this research was to study the growth of sunflower plants planted in the media of sediment mud in water channel and urban organic compost waste (Sari et al., 2020). The results of this study will be a recommended reference for the development of urban farming in Surabaya by reducing the use of garden soil and compost imported from outside the city. In addition, it can encourage the use of sediment mud in water channel and urban organic compost waste.

2. RESEARCH METHODS

Sunflower seeds are obtained from the Fiber Crop Research Institute (Balitas) Malang. They are selected base on their clean skin, color, maximum seed size, and the seeds are still intact. 120 seeds were needed in this research with 30% reserve seeds. They are soaked in hot water (100^{o}C) for 30 minutes, then continued soaked in room temperature water for 12 hours. They are drained and then brewed for 24 hours until the radicel seeds appear to sprout ready to be planted 2 seeds per polybag.

Sediment muds are obtained from normalized of rivers, reservoirs, highway water channel, and residential sewerage in Surabaya. They were dried and then blended. Garden soil purchased from a plant shop in Surabaya. It was the topsoil of an agricultural land broke from Mojokert. Sediment mud and spilled garden soil are ready for experiments.

Urban organic compost waste was obtained from the composting of dried leaf waste mixed with wet waste carried out in the Surabaya Jambangan compost house. The branches and twigs were shedding and ready to be used to make compost. The composting process is layered, which is the lowest layer of dried leaves as thick as 10 cm, then the second layer of wet garbage is superimposed on 10 cm thick. So that, it is composed of 5 layers of dried leaves biomass and 5 layers of wet garbage. Each layer was given an activated microbial starter and composted biomass. So, semi-anaerobically process happened. After 50 days incubation period, the compost biomass was dismantled and stirred. Then, it left for 10 days. The composted biomass was ready to be used for the experiment (Haryanta et.al., 2017).

Experimental design

The research was conducted from February to September 2018 at the Wijaya Kusuma University Experimental Garden in Surabaya. Factorial experiments with two treatment factors arranged in a Randomized Block Design. The treatment factor I is the origin of the sediment mud

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

in water channel which consists of five levels, namely T_1: river sediment mud, T_2: pond sediment mud, T_3: highway water channel sediment mud, T_4: sediment mud of residential sewerage, and T_5: garden soil as a comparison factor. Treatment factor II is the amount of addition of urban organic compost waste (B) which consists of four levels, namely B_0: Control (without addition of compost); B_1: 10% addition of compost; B_2: 20% addition of compost; and B_3: 30% addition of compost. The combination of the two treatment factors obtained 20 treatment combinations which were repeated three times. The experimental unit is one plant in polybag with 50 cm diameter and filled with media as high as 40 cm. So that, there are 60 polybags are prepared.

Statistical analysis

Variables of sunflower growth include plant height, number of leaves, leaf size (calculated by the widest leaf area), and stem diameter. Observation of growth variables was carried out at 7-day intervals starting from plants aged 7 to 56 days after plants began to flower. Variables of sunflower production include flowering age, plant height or length to flower, flower disk diameter, crown diameter, seed bunch weight, and seed weight. Data were analyzed by analysis of variance and if the F test showed a real difference, proceed with the smallest real difference test (LSD) of 5%.

Results and Discussion

Plant height

Data on plant height are presented in Table 1. The results of the analysis of the variety of data on height sunflower plants showed no interaction between the treatment factors of the sediment mud and doses of urban organic compost waste treatment.

Table 1: The average value of Sunflower plant height (*Helianthus annuus L.*) with various sources of sediment mud and various doses of urban compost waste (cm)

Treatment	The observation of plant age (DAP)							
	7	14	21	28	35	42	49	56
T_1	7,93^{b}	26,67^{b}	42,25^{b}	52,00	70,79	93,33	127,00	159,50
T_2	9,06^{a}	28,88^{a}	45,46^{a}	55,54	74,00	96,83	133,42	162,92
T_3	8,40^{ab}	26,17^{b}	41,96^{b}	53,88	73,92	95,83	132,83	164,17
T_4	7,76^{b}	25,38^{b}	41,38^{b}	52,46	72,10	95,42	129,67	161,67
T_5	8,81^{a}	29,71^{a}	45,55^{a}	55,46	74,50	98,96	136,10	168,25
LSD	0,78	1,97	2,87	NS	NS	NS	NS	NS
B_0	8,02	26,10^{c}	41,47	51,90	70,80	92,57^{b}	125,27^{c}	156,40^{b}

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

B_1	8,68	28,00^{ab}	43,13	53,53	72,33	95,30^{ab}	129,47^{bc}	162,07^{b}
B_2	8,64	28,93^{a}	45,13	54,80	73,47	96,63^{ab}	133,13^{ab}	163,53^{b}
B_3	8,23	26,40^{bc}	43,54	55,23	75,57	99,80^{a}	139,27^{a}	171,20^{a}
LSD		1,77	NS	NS	NS	4,82	7,56	7,41

Note: The average value followed by the same letter is not significantly different based on the 5% LSD's test. NS: not significant. DAP: the day after planting

Sediment mud waters significantly affect plant height at the beginning of plant growth (up to 21 days old plants) and do not significantly affect plant height at the end of growth (until flowering plants). Sediment mud from rivers, ponds, highway water channel, and residential sewerage, and garden soil has the same effect on the height of the suflower plant. Providing of sediment mud as a source of organic material in the cultivation of sunflower plants can reduce the level of soil alkalinity, increase total nitrogen, dissolved phosphate content, plant height, and plant biomass dry weight (Bourioug, 2018).

The dose of urban compost waste has a significant effect on plant height. Addition of compost as much as 30% (B_3) can increase the height of sunflower plants compared to controls. Addition of compost can improve the availability of nutrients in the soil by increasing soil aeration, increasing the capacity to store water, reducing pH, increasing the availability of N, P, K, some micro elements, and organic matter to create suitable conditions for plant growth (Osman, 2014). Addition of compost can increase shoot and root length of sunflower because it can increase soil fertility by improving soil biological properties (Badar and Qureshi, 2015). Compost of household waste has an effect on the growth of sunflowers, the highest plants, and most leaves at a dose of 220 kg/ha (Esmaeilian et al., 2012).

Number of Leaves

Data on the number of leaves are presented in Table 2. The results of the analysis of the variety of data on the number of leaves of sunflower plants showed no interaction between the treatment factors of the source of sediment mud and the treatment factor concentration of urban compost waste.

Table 2: Average number of leaves of Sunflower (*Helianthus annuus L.*) with sediment mud and urban compost waste

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Treatment	The average value for observing the age of the plant (DAP)							
	7	**14**	**21**	**28**	**35**	**42**	**49**	**56**
T_1	4,92^{b}	11,17^{b}	16,17^{bc}	16,42	22,75	31,50	37,92	43,83
T_2	5,67^{a}	12,25^{a}	17,67^{a}	16,58	22,25	30,92	38,42	43,83
T_3	4,83^{b}	11,08^{b}	16,58^{bc}	17,92	23,17	31,75	39,00	45,33
T_4	4,50^{b}	11,00^{b}	15,67^{c}	16,75	23,00	31,75	38,75	45,58
T_5	5,83^{a}	12,42^{a}	16,83^{ab}	17,75	23,50	32,67	39,75	44,92
LSD	0,71	0,63	0,97	NS	NS	NS	NS	NS
B_0	4,87	11,00^{b}	15,33^{b}	15,20^{c}	21,80^{bc}	30,13^{c}	36,47^{c}	42,47^{c}
B_1	5,33	11,93^{a}	16,00^{b}	16,80^{b}	22,20^{c}	31,20^{bc}	38,40^{b}	44,27^{b}
B_2	5,07	11,93^{a}	17,27^{a}	17,47^{b}	23,40^{ab}	32,47^{ab}	39,80^{ab}	45,67^{ab}
B_3	5,33	11,47^{ab}	17,73^{a}	18,87^{a}	24,33^{a}	33,07^{a}	40,40^{a}	46,40^{a}
LSD	NS	0,57	0,87	1,30	1,19	1,59	1,66	1,58

Note: The average value followed by the same letter is not significantly different based on the 5% LSD's test. NS: not significant. DAP: the day after planting

Sediment mud water does not significantly affect the number of leaves. Sediment mud from rivers, ponds, highway water channel, residential sewerage, and garden soil have same effect on the junctions of plant leaves.

The concentration of urban compost waste has a significant effect on the number of leaves. Most leaves are found in plants with the addition of 30% compost (B_3). Providing organic fertilizer (compost) increases the content of chlorophyll a, chlorophyll b, and carotinoids. Chlorophyll content increases until the plant is 60 days old and then it decreases (Osman et al., 2014). The application of organic fertilizer increases efficiency in the development of sunflower plants (Urbaniak et al., 2017). Compost of household waste influences the growth of sunflowers (plant height and many leaves) (Esmaeilian et al., 2012). The use of compost increases the organic matter content and K is available. Giving compost can increase plant height, number of leaves, and size of flower buds because plants get more nutrients (Lăcătușu et al., 2017).

Size of Leaves

Data on leaf size (leaf area) per leaf sheet are presented in Table 3. The results of the analysis of the variety of extensive data on leaves of sunflower plants showed no interaction between the source of sediment mud and concentration of urban compost waste treatment factors.

Table 3: Average value of leaf area of sunflower (*Helianthus annuus L.*) with sediment mud and urban compost waste (cm^2)

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Treatment	The average value for observing the age of the plant (DAP)						
	14	**21**	**28**	**35**	**42**	**49**	**56**
T_1	139,77^{c}	248,38	272,75	337,92^{bc}	456,42^{ab}	480,08^{b}	636,25^{ab}
T_2	180,63^{ab}	266,33	277,11	336,69^{bc}	403,65^{b}	478,33^{b}	568,08^{b}
T_3	151,48^{bc}	276,46	296,44	381,58^{a}	491,22^{a}	578,08^{a}	636,92^{ab}
T_4	152,62^{bc}	238,42	256,83	320,90^{c}	469,25^{a}	557,08^{ab}	709,17^{a}
T_5	193,28^{a}	275,25	299,85	361,30^{ab}	480,81^{a}	628,08^{a}	715,67^{a}
LSD	30,30	NS	NS	34,90	53,71	82,76	84,33
B_0	134,35^{c}	207,97^{c}	210,23^{c}	261,41^{c}	441,87	563,60	654,73^{ab}
B_1	165,90^{ab}	240,80^{b}	255,69^{b}	316,77^{b}	459,27	558,53	704,33^{a}
B_2	190,55^{a}	299,89^{a}	313,68^{a}	393,63^{a}	466,20	510,60	589,67^{b}
B_3	163,42^{b}	295,74^{a}	342,78^{a}	418,90^{a}	473,74	544,60	664,13^{ab}
LSD	27,10	29,81	29,32	31,21	NS	NS	75,43

Note: The average value followed by the same letter is not significantly different based on the 5% LSD's test. NS: not significant. DAP: the day after planting

Sediment mud has a significant effect on leaf area. But, sediment mud media from ponds has smaller leaf. Agricultural land that was given 30 tons/ha of sewage mud for 8 consecutive years experienced an increase in pH value, phosphate content, calcium content, and organic carbon content (Ailincăi et al., 2012). Sediment mud can increase plant biomass, average leaf surface area, chlorophyll a, and chlorophyll b content (Urbaniak et al., 2017). Utilization of sewage sludge in sunflower media influences the decrease in soil pH value, increase in electrical conductivity, organic matter content, total N, P-available, and exchange rates of Na, K, and Ca. Mud gutters increase root length, plant length, leaf number, biomass weight, and antioxidant activity in plants (Belhaj et al., 2016).

The concentration of urban compost waste has a significant effect on leaf area and the addition 20% of compost (B_2) and 30% (B_3) show that the leaves tend to be wider. Compost significantly increases the amount of chlorophyll of sunflower plants (Osman et al., 2014). Giving compost increases nutrient availability and can increase the growth of production and oil content of sunflower seeds (Sabreen et al., 2015).

Stem Diameter

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agrisciencescientific-work.org/index.php/agriscience

Stem diameter data are presented in Table 4. The analysis of the variety on stem diameter of sunflower plants showed no interaction between the treatment factors of the source of sediment mud and concentration of urban compost waste treatment factors.

Table 4: Average value of stem diameter of Sunflower (*Helianthus annuus L.*) with sediment mud and urban compost waste (cm)

Treatment	Average value of plant age observations (HST)					
	21	**28**	**35**	**42**	**49**	**56**
T_1	0,67[d]	1,00[b]	1,26	1,73[b]	2,00b	2,23
T_2	0,84[ab]	0,99[b]	1,27	1,68[b]	1,94b	2,23
T_3	0,78[bc]	1,06[b]	2,19	1,74[b]	2,06b	2,30
T_4	0,74[cd]	0,97[b]	1,24	1,72[b]	2,01b	2,30
T_5	0,88[a]	1,09[a]	1,36	1,87[a]	2,17a	2,46
LSD	0,08	0,054	NS	0,11	0,15	NS
B_0	0,68[c]	0,88[c]	1,81	1,62[c]	1,91[c]	2,15[c]
B_1	0,76[b]	0,97[b]	1,23	1,72b[c]	1,99[bc]	2,25b[c]
B_2	0,86[a]	1,10[a]	1,37	1,79[ab]	2,07[ab]	2,34a[b]
B_3	0,82[ab]	1,13[a]	1,45	1,86[a]	2,17[a]	2,47[a]
LSD	0,07	0,048	NS	0,10	0,13	0,18

Note: The average value followed by the same letter is not significantly different based on the 5% LSD test. NS: not significant. DAP: the day after planting

Sediment mud has no significant effect on stem diameter, but the plants in the garden soil media are larger than in the sediment mud media. This result is different which states that the provision of sediment mud can reduce the level of soil alkalinity, increase the total Nitrogen and dissolved phosphate content. So, it can increase plant height and dry weight of plant biomass (Bouriouget al., 2015).

The concentration of urban compost waste has a significant effect on stem diameter, the addition 30% (B_3) of urban compost are larger plant stems. Osman (2014) reported that compost significantly increased the dry weight of biomass of sunflower plants. In line with this research, application of tea compost has a positive effect on the variable growth of sunflower plants (plant height, stem diameter, and leaf area). Compost tea plays a role in increasing the supply of nutrients in the soil and increasing the efficiency of fertilizers in the soil (Sabreen al., 2015). Utilization of green plant biomass compost can increase the growth of sunflower plants, namely increasing height, leaf number, leaf size, and fresh weight of plants (Taguiling, 2013). Addition of compost to soil can increases plant biomass, the addition of 800 g/pot produces the highest sunflower biomass of 0.14 kg dry weight (Noviardi, 2013; Noviardi and Damanhuri, 2016).

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Production Variables

Variable production data include flowering age and plant length. The diameter of seed yields, crown diameter, seed bunch weight, seed weight, and seed weight yield toward the weight of seed bunches are presented in Table 5. The results of the variance analysis showed no significance between the treatment factors of the source of sediment mud and concentration of urban compost waste treatment factors for all variable production of sunflower plants.

Table 5: Average value of variable production of sunflower (*Helianthus annuus L.*) with sediment mud and urban compost waste

Treatment	The average value of the experimental variable						
	Flowering age (days)	high until flower (cm)	disk diameter (cm)	crown diameter (cm)	seed bunch weight (gr)	seed weight (gr)	seed yield to bunches (%)
T_1	48,17	201,42^{ab}	26,04	42,21^{c}	587,92	111,27	19,44
T_2	47,58	188,08^{c}	26,63	42,75^{b}	554,17	101,18	19,11
T_3	47,00	192,67^{b}	27,50	45,13^{a}	623,17	107,88	17,63
T_4	49,67	211,92^{a}	28,13	44,63^{ab}	617,58	112,87	19,01
T_5	46,67	198,67^{bc}	27,33	43,95^{abc}	587,33	111,61	18,76
LSD	NS	11,42	NS	2,10	NS	NS	NS
B_0	50,00^{a}	204,60	26,13^{b}	42,67	566,73	109,72	19,77
B_1	48,07^{ab}	196,27	27,07^{b}	43,73	596,67	108,75	18,54
B_2	46,80^{b}	194,73	26,97^{b}	43,40	597,67	103,41	17,68
B_3	46,40^{b}	198,60	28,53^{a}	45,01	614,67	113,97	19,16
LSD	2,52	NS	1,39	NS	NS	NS	NS

Note: The average value followed by the same letter is not significantly different based on the 5% LSD's test. NS : not significant

The source of sediment mud has significant effect only on variable plant length and diameter of flower crown. The longest plant in the sediment mud of residential sewerage media and widest diameter crown in the highway water channel sediment mud media. The five soil sources tested, the sediment mud of residential sewerage and the highway water channel sediment have relatively high levels of N, P, and K elements compared to others, even though they are not the highest (Haryanta, D. et al, 2017). The sediment mud application increases seed production per flower bunch, but does not affect seed weight and oil content (Lavado, 2006).

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

The concentration of urban compost waste has a significant effect on the variable age of flowering and the variable diameter of the seed bunches. The addition of 20% (B_2) and 30% (B^3) urban compost waste can shorten flowering life (shorten 4 days) and the largest diameter of the seed bunches in 30% of urban compost waste (B_3). The five soil sources tested, all of them have a clay texture (Haryanta, D. et al. 2017) so that the addition of compost as a source of organic matter will make the soil more crumbly. Compost increased dry weight, seed yield and sunflower oil content significantly (Osman et al., 2006). The treatment of chicken manure and leaf compost waste can increase seed weight, biomass dry weight, NPK element uptake during growth and the seed formation phase (Helmy and Ramadan, 2017). Mixture of sediment mud waste (60%) with fresh leaf waste (40%) can provide micro and macro elements needed by plants, increase the concentration of aromatic compounds and reduce aliphatic group compounds (Vaca, 2011). The urban waste composting gave a significant effect on variables of production (harvest weight, number of bulbs, and dry weight of consumtion) on onion plants (Haryanta, D. et.al., 2019)

4. CONCLUSION

Based on the results of data analysis and discussion can be concluded as follows:

1. There is no interaction between the treatment factors of the watershed sediment sludge and the concentration / dose of urban organic waste compost treatment on all experimental variables.
2. The treatment of sediment sludge has significant effect on leaf area variables, ie wider leaves obtained on T_4 media (housing sewer deposits) and T_5 (garden soil), plant length to flower and flower crown diameter, which is the highest value on T_3 media (highway sewage sludge) and T4 (housing sewer deposits).
3. The treatment of concentration / dose of urban organic waste compost can significantly increase the growth of sunflower plants with indicators of increasing plant height, number of leaves, leaf area, stem diameter, and diameter of disk bunches and shorten flowering life. The optimal concentration / dose is the administration of urban organic waste compost as much as 20% (T_2).
4. The treatment of water sediment sludge as well as the treatment of concentration / dose of urban organic waste compost does not significantly affect the production variables, namely seed bunch weight, seed weight, and seed weight yield to bunch weight).

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

5. Soil sludge deposition of highway gutters and residential sewer deposits can be used as a medium for cultivating sun flower plants as ornamental plants (not seed production plants) replacing garden soil by providing municipal waste compost as much as 20% (B_2).

REFERENCE

Ailincăi C., Jităreanu G., Bucur D., Ailincăi D. (2012). Soil Quality and Crop Yields, After Utilization of Sewage Sludge on Agricultural Land, in The Moldavian Plain, *Romania. Cercetări Agronomice în Moldova* Vol. XLV , No. 1 (149)

Badar R. and Qureshi SA. (2015). Utilization of composted agricultural waste as organic fertilizer for the growth promotion of sunflower plants. Journal of Pharmacognosy and Phytochemistry 2015; 3(5): 184-187

Baghaie1 AH., Khoshgoftarmanesh AH., and Afyuni. (2016). Phytoavailability of Lead (Pb) for Corn and Sunflower as Affected by Pb-Enriched Sewage Sludge and Cow Manure. *Journal of Residuals Science & Technology,* Vol. 13, No. 4 October 2016

Belhaj D., Elloumi N., Jerbi B., Zouari M., Abdallah FB., Ayadi H., Kallel M. (2016). Effects of sewage sludge fertilizer on heavy metal accumulation and consequent responses of sunflower (*Helianthus annuus). Environ Sci Pollut Res Int.* 2016 Oct; 23(20):20168-20177. Epub 2016 Jul 19

Bourioug M., Abouabdillah A., and Aleya L. (2018). Sewage Sludge Used as Organic Manure in Moroccan Sunflower Culture: Effects on Certain Soil Properties, Growth and Yield Components. *Science of The Total Environment* 627:681-688. DOI: 10.1016/j. scitotenv.2018.01.258

Crabtree. (1989). Sediments in Sewers. *Pollution Management Group, WRe, Swindon. J./WEM*, 1989, 3 December

Eid EM., Alrumman SA., El-Bebany AF., Hesham AE., Taher MA., and Fawy KF. (2017). The Effects of Different Sewage Sludge Amendment Rates on The Heavy Metal Bioaccumulation, Growth and Biomass of Cucumbers (*Cucumis sativus* L.). Environ Sci Pollut Res Int 2017 Jul;24(19):16371-16382. doi: 10.1007/s11356-017-9289-6. Epub 2017 May 26.

Esmaeilian Y., Sirousmehr AR., Asghripour MR., Amiri E. (2012). Comparison of Sole and Combined Nutrient Application on Yield and Biochemical Composition of Sunflower under Water Stress. *International Journal of Applied Science and Technology Vol. 2 No. 3; March 2012.*

Haryanta, D., Thohiron, M., dan Gunawan, B. (2017). Kajian Tanah Endapan Perairan Sebagai Media Tanam Pertanian Kota. *Journal of Research and Technology*, Vol. 3 No. 2 Desember 2017. P-ISSN: 2460 – 5972. E-ISSN: 2477 – 6165

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Haryanta, D., Thohiron, M., dan Gunawan, B. (2017). The Development of Mass Production Technique of Urban Dry Leaf Litter and Wet Garbage Biomass. *IOSR Journal of Agriculture and Veterinary Science*, Vol. 10, Issue 10 Ver. IV (October 2017). e-ISSN: 2319-2380, p-ISSN: – 6165

Haryanta, D., Thohiron, M., dan Gunawan, B. (2019). Study of Onion Growth (*Allium ascalonicum* L.) Using Sediment Soil Media and Urban Waste Compos. IOP Conference Series: Earth and Environmental Science 230 (2019) 012086. Doi: 10.1088/1755-1315/230/1/012086.

Helmy AM. and Ramadan MF. (2017). Agronomic performance and chemical response of sunflower (*Helianthus annuus* L.) to some organic nitrogen sources and conventional nitrogen fertilizers under sandy soil conditions. Grasas Y Aceites, 60 (1), *Enero- Marzo*, 55-67, 2009, ISSN: 0017-3495 DOI: 10.3989/gya.032508

Jadia C.D. dan Fulekar MH. (2008). Phytoremediation: The Application Of Vermicompost To Remove Zinc, Cadmium, Copper, Nickel And Lead By Sunflower Plant. *Environmental Engineering and Management Journal* Vol.7. Technical University of Lasi, Romania.

Juniarti R. dan Herdiana Y. (2017). *Review Article:* Aktivitas Ekstrak *Helianthus annuus* L. *Farmaka Suplemen* Volume 15 Nomor 2

Lavado RS. (2006). Effects of Sewage-Sludge Application on Soils and Sunflower Yield: Quality and Toxic Element Accumulation. *Journal of Plant Nutrition*, Volume 29, 2006 - Issue 6

Noviardi R. and Damanhuri TP. (2016). Penyerapan Logam Timbal (Pb) pada Tanaman Bunga Matahari *(Helianthus Annuus L.) d*engan Variasi Penambahan Kompos dan Limbah Batubara pada Media Tanah. *Ecolab* Vol. 9 No. 2 Juli 2015 : 47 – 104

Noviardi R. (2013). Limbah Batubara Sebagai Pembenah Tanah dan Sumber Nutrisi : Studi Kasus Tanaman Bunga Matahari *(Helianthus Annus). Jurnal RISET Geologi dan Pertambangan, Vol.23, No.1, Juni 2013, 61-72*

Osman EAM., El- Galad, Khatab KA., and El-Sherif MAB. (2014). Effect of Compost Rates and Foliar Application of Ascorbic Acid on Yield and Nutritional Status of Sunflower Plants Irrigated with Saline Water. *GJSR Journal*. Vol. 2(6), pp. 193-200, 31 March, 2014.

R.Vaca, Lugo J., Martínez R., Esteller MV., and Zavaleta H. (2011). Effects of Sewage Sludge and Sewage Sludge Compost Amendment on Soil Properties and *Zea Mays* L. Plants (Heavy Metals, Quality And Productivity). *Rev. Int. Contam.* Ambie. 27(4) 303-311, 2011

Radu L., Anca-R. L., Romeo C., Mihaela L., Rodica L., Irina R. M. (2017). The Effect of an Organic Waste Compost on The Agro-Chemical Characteristics of The Soil, and The Mineral Composition of The Sunflower Leaves. *PESD* VOL. 11, no. 1, 2017. DOI 10.1515/pesd-2017-0009

ISSN: 2597-8713 (Online)
ISSN: 2598-5167 (Print)
Agricultural Science

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Rahman MM., Sultana S., Al Mahmud Md A., Islam KN. (2017). Green Manure Potentials of Water Hyacinth and Sewage Sludge: The Seed Germination and Seedling Growth Trials Of *Albizia saman.* Research in: *Agricultural & Vet. Sci*. Vol.1, No.1, 2017, pp.18-31

Ramdani, N., Lousdad A., Hamou A. (2015). Study of The Biodegradation and Fertility of The Co-Composting Produced from Sewage Sludge and Green Waste and Its Effects on The Speciation of Heavy Metals. *J. Mater. Environ. Sci. 6 (5) (2015) 1310-1320 Ramdani et al. ISSN : 2028-2508.CODEN: JMESCN*

Roy S K., Sharma RC., and Trehan SP. (2001). Integrated Nutrient Management by Using Farmyard Manure and Fertilizers in Potato–Sunflower–Paddy Rice Rotation in the Punjab. *The Journal of Agricultural Science* Vol. 137 Issue 3, November 2001 , pp. 271-278

Sabreen Kh. P., Ebtisam I. E., Soha E. K.l, and M. Abd El-H. (2015). Effect of Compost Tea on Growth Character of Sunflower (*Helianthus Annuus* L.) Under Surface and Subsurface Drip Irrigation. *International Journal of ChemTech Research* CODEN (USA): IJCRGG ISSN: 0974-4290 Vol.8, No.6, pp 490-495, 2015.

Sari, I. P., Hidayati, S., Ali, M., & Purwanti, S. (2020). Application of Urban Waste Organic Fertilizer on the Growth of Mustard Plants (Brassica Juncea L.). *Agricultural Science*, *4*(1), 74–84.

Shuangshuang C., Daoming W., Liang LL., Fengdi Z., Yaping H., Xinsheng H., Can L., & Shucai Ze. (2017). Municipal Sewage Sludge Compost Promotes *Mangifera Persiciforma* Tree Growth with No Risk of Heavy Metal Contamination of Soil. *Scientific REPOrTS* | 7: *13408* | DOI:10.1038/s41598-017-13895-y.

Taguiling MALG. (2013). Quality Improvement of Organic Compost Using Green Biomass. *European Scientific Journal* December 2013 edition vol.9, No.36 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431

Tjahaja PI and Sukmabuana P. (2007). Penyerapan ^{134}Cs dari Tanah oleh Tanaman Bunga Matahari (*Helianthus anuus,* Less). *Prosiding Seminar Nasional Sains dan Teknologi Nuklir* PTNBR – BATAN Bandung, 17 – 18 Juli 2007.

Urbaniak M., Wyrwicka A., Tołoczko W., Serwecińska L., Zieliński M. (2017). The Effect of Sewage Sludge Application on Soil Properties and Willow (*Salix* sp.) *Cultivation. Sci Tota Environ*. 2017 May 15;586:66-75. doi: 10.1016/j.scitotenv.2017.02.012. Epub 2017 Feb 12

Wiera Sadej and Anna Namiotko. (2010). Content of Zinc in Plants Fertilized with Municipal Solid Waste and Urban Green Waste Compost. *Journal Elementol*. 2010, 15(4): 679 - 692