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Increasing The Growth And Production Of Sweet Corn (*Zea mays saccharata*) by Giving Chicken Manure And Vegetable Waste Liquid Organic Fertilizer

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ABSTRACT

Applying organic fertilizers can improve the physical and biological properties of the soil. One of the organic fertilizers that can be used is chicken manure with the addition of POC vegetable waste. This study aims to determine the effectiveness of applying organic chicken manure and POC vegetable waste on the growth and production of sweet corn (Zea mays Saccharata). This study used a factorial randomized block design (RBD) consisting of 2 factors with 16 combinations and 3 blocks. The first factor is the application of organic chicken manure (A), which consists of 4 levels. 0 g/plot, 700 g/plot, 1400 g/plot, 2100 g/plot. The second factor is the provision of POC of vegetable waste (S) which consists of 4 levels, namely, 0 ml/liter of water/plot, 300 ml/liter of water/plot, 500 ml/liter of water/plot, 700 ml/liter of water/plot.The parameters observed were plant height (cm), number of leaves (strands), cob length (cm), cob diameter (cm) and production weight using klobot per plot (g). The results showed that the application of organic chicken manure had a significant effect on Production weight parameters used husks per plot (g) and had no significant effect on plant height (cm), number of leaves (strands), cob length (cm) and cob diameter (cm).

Keywords: *doses, sweet corn, chicken manure, vegetable waste, organic fertilizer*

1. INTRODUCTION

Corn is one of the world's most essential crops. Corn is the primary source of carbohydrates and an alternative source of animal fodder in Central and South America. Several regions in Indonesia (Sumatra) rely on maize as their primary nutrition source; oil is extracted, and the grain is processed into flour and industrial raw materials. And in the region of Sumatra, the majority of the produced maize can be utilized as raw materials for animal feed (poultry). Animal feed may be made from corn products and stalks (Warisno 2013).

The market demand for sweet corn continues to rise, but Indonesian farmers and entrepreneurs have not completely exploited large market opportunities due to various constraints. The average yield of sweet maize per hectare in Indonesia is 8.31 tons. Through fertilization, both the quantity and quality of sweet maize can be increased. Nutrient-deficient soil conditions compromise soil's chemical, physical, and biological properties. Therefore, sweet corn requires adequate nutrients for its growth and optimal results. The required nutrients can be obtained from organic fertilizers (Sari *et al.* 2016).

Organic fertilizers can be used as an alternative to synthetic fertilizers in order to lessen the environmental impact of synthetic fertilizers. Organic fertilizers are derived from either vegetation or animal manure. Organic fertilizers contain sufficient quantities of micronutrients and can enhance the soil's physical, chemical, and biological properties (Prasetyo *et al.* 2013).

The use of organic fertilizers has numerous benefits, including the ability to enhance the soil's structure and texture. Fertilizer has natural properties that cannot harm vegetation. Nitrogen, phosphorus, potassium, calcium, and sulfur are the macro elements present, followed by micro elements such as magnesium (Mg) and manganese (Mn). Additionally, manure has a lasting effect on plants (Setiawan 2015).

The application of 10 tons of organic poultry manure per hectare significantly affected corn plant height and had the greatest impact on corn plant height. In addition, liquid organic fertilizer (LOF) is applied as an excellent solution containing nutrients that plants readily assimilate. One portion of the plant can be sprayed with POC solution to apply it. POC can be produced from a variety of organic materials, including vegetable waste. POC liquid vegetable extract is a liquid organic fertilizer produced from decomposing vegetable waste that is discarded and rots in both the market environment and on agricultural land due to high yields (Fahrurrozi *et al.* 2015).

This investigation aimed to ascertain the efficacy of organic fertilizer chicken manure and vegetable waste poc on the growth and yield of sweet corn.

2. MATERIAL AND METHODS

This research was carried out in August - October 2022 which is located on Jln. Binjai – Kuala Km.13, Padang Cermin Village, Worship Alley. This research was carried out in August - October 2022 which is located on Jln. Binjai – Kuala Km.13, Padang Cermin Village, Worship Alley. The research flowchart can be seen in Figure 1.

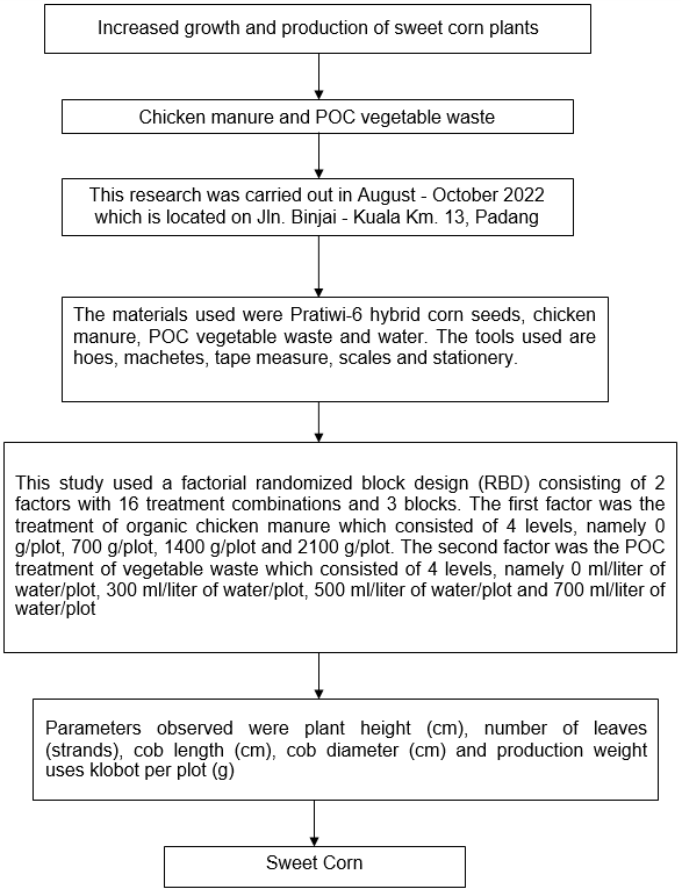

Figure 1. Research Flowchar

3. RESULT AND DISCUSSION

Plant Height (cm)

The average yield of plant height (cm) of sweet corn in the treatment of organic chicken manure and POC vegetable waste at the age of 2, 4 and 6 weeks after planting (MST) can be seen in Table 1.

Table 1. Mean Plant Height (cm) of Sweet Corn Plants on Organic Fertilizer Treatment of Chicken Manure and POC Vegetable Waste at 2, 4 and 6 Weeks After Planting (MST)

TREATMENT	PLANT HEIGHT (cm)		
	2 MST	4MST	6 MST
0 g/plot	32,15	64,52	110,06
700 g/plot	32,40	63,54	106,92
1400 g/plot	30,77	61,85	101,02
2100 g/plot	30,23	60,69	97,79
0/liter air/plot	30,92	62,44	102,40
300/liter air/plot	31,79	63,06	108,13
500/liter air/plot	32,79	65,63	107,02
700/liter air/plot	30,04	59,48	98,25

Numbers in the same column followed by letters that are not the same are significantly different at the 5% level.

Table 1 shows that the highest plants received 0 g/plot of poultry manure organic fertilizer, or 110.06 cm, while the lowest received 2,100 g/plot, or 97.79 cm. The tallest plants were discovered in the provision of POC for vegetable refuse (300 ml/liter water/plot), measuring 108.13 cm. In contrast, the shortest plants were discovered in 700 ml/liter water/plot, measuring 98.25 cm. According to research (Nurcahya et al., 2017), the tallest plant is 185 centimeters, whereas in the conducted research, the maximum level was 700 grams per plot, and the results were below, at 110 centimeters. According to (Setiawan, 2015), organic fertilizers contain insufficient plant nutrients, are slowly available to plants, and have been unable to provide adequate N, P, and K. This is also due to the low nutrient content of the soil, so there is no visible response to the addition of nutrients through fertilization. The deficiency of nitrogen, phosphorus, and potassium will inhibit the growth of plants.

Number of Leaves (strands)

The results of the average number of leaves (strands) of corn due to the treatment of organic chicken manure and POC vegetable waste at the age of 2, 4 and 6 weeks after planting (MST) can be seen in Table 2.

Table 2. Mean Number of Leaves (strands) of Corn Plants in the Treatment of Organic Fertilizer Chicken Manure and POC Vegetable Waste at 2, 4 and 6 Weeks After Planting (MST)

TREATMENT	Number of Leaves (strands)		
	2MST	4MST	6 MST
0 g/plot	7,02	9,21	11,88
700 g/plot	6,88	9,00	12,00
1400 g/plot	6,69	8,38	11,35
2100 g/plot	6,35	8,40	11,65
0/liter air/plot	6,71	8,83	11,81
300/liter air/plot	6,85	8,75	11,77
500/liter air/plot	6,94	9,00	11,94
700/liter air/plot	6,44	8,40	11,35

Numbers in the same column followed by letters that are not the same are significantly different at the 5% level.

The treatment of chicken manure and POC vegetable refuse had no significant effect on the number of leaves, as shown in Table 2. According to research (Prasetyo et al., 2013), the number of maize leaves on plants treated with 10 tons/ha of solid organic fertilizer was 14,00 lots, and the results of this study were derived from 14 leaves. Due to the lack of N, P, and K, plants will exhibit weak vegetative growth. According to a statement by Khoir et al. (2017), the function of N, P, and K is to stimulate the vegetative growth of plants and the formation of chlorophyll and chloroplasts in leaves, which later aid the process of photosynthesis. When N, P, and K are deficient, plants will exhibit suboptimal growth. Therefore, fertilization must be performed proportionately, with the proper type and quantity..

Cob Length (cm)

The average yield of sweet corn cob length (cm) in the treatment of organic chicken manure and POC vegetable waste can be seen in Table 3.

Table 3. Mean Cob Length (cm) of Corn Plants in the Treatment of Organic Fertilizer Chicken Manure and POC Vegetable Waste

Treatment	Cob Length (cm)
0 g/plot	19,83
700 g/plot	20,15
1400 g/plot	20,71
2100 g/plot	20,23
0/liter air/plot	20,08
300/liter air/plot	20,44
500/liter air/plot	20,48
700/liter air/plot	19,92

Numbers in the same column followed by letters that are not the same are significantly different at the 5% level.

The treatment of chicken manure organic fertilizer and vegetable waste POC had no significant effect on cob length (cm) as shown in Table 3. According to (Doddy D. 2016), the greatest cob length with a solid organic fertilizer dose of 10 tons/ha was 22 cm, and the results obtained in this study were different. This is because the maize plant absorbs the nutrients N, P, and K, which influence the growth of cob length. Inadequate quantity of treatment composition, so that the required compounds are insufficient for plants. Important in plant cultivation is determining the concentration of organic N, P, and K fertilizers to be used, which will influence the fulfillment of macro compounds required by plants so that N, P, and K nutrients have no effect (Patima et al., 2014). This is consistent with the assertion (Sutrisna et al., 2018) that a plant's optimal biological activity and metabolism will result from sufficient nutrients in the soil. This is the ability of plants to translocate and assimilate into seeds, which indirectly affects seed size and the length of sweet maize plants' fruits.

Cob Diameter (mm)

The average yield of sweet corn cob diameter (mm) in the treatment of organic chicken manure and POC waste can be seen in Table 4.

Table 4. Mean Cob Diameter (mm) of Corn Plants in the Application of Organic Fertilizer Chicken Manure and POC Vegetable Waste

Treatment	Cob Diameter (mm)
0 g/plot	60,27
700 g/plot	60,48
1400 g/plot	60,47
2100 g/plot	60,71
0/liter air/plot	60,39
300/liter air/plot	60,40
500/liter air/plot	60,50
700/liter air/plot	60,65

Numbers in the same column followed by letters that are not the same are significantly different at the 5% level.

The treatment of chicken manure and POC of vegetable waste had no significant effect on cob diameter, as shown in Table 4. According to previous research (Hidayah et al., 2016), the greatest cob diameter was 70.33 mm, whereas the maximum Diameter in this study was 60.71 mm. The length of irradiation and the amount of nutrients plants absorb influence the expansion of sweet maize cobs. This is consistent with the assertion (Nurcahya et al., 2017) that plant growth will improve if the concentration of organic fertilizer is increased and tailored to plant requirements. If a plant is deficient in N, P, and K, cob length and diameter growth is inhibited, preventing maximum generative growth. Elements N, P, and K aid in developing flowers, crops, and seeds.

Production Weight uses Klobot Per Plot (g)

The results of the average production weight using husks per plot (g) of sweet corn in the treatment of chicken manure and POC vegetable waste can be seen in Table 5.

Table 5. Average Production Weight Using Klobot Per Plot (g) Sweet Corn in the Treatment of Chicken Manure and POC Vegetable Waste

Treatment	Production Weight (g)
0 g/plot	1966,67 b
700 g/plot	2158,33 a
1400 g/plot	1908,33 b
2100 g/plot	1775,00 c
0/liter air/plot	1925,00
300/liter air/plot	1991,67
500/liter air/plot	1983,33
700/liter air/plot	1908,33

Numbers in the same column followed by letters that are not the same are significantly different at the 5% level (Lower case)

Table 5 shows that the treatment with chicken manure genuinely affected the weight of husks produced per plot. According to research (Hidayah et al., 2016), the optimal dose was 20 tons per hectare, whereas in this study, the optimal dose was 700 grams per plot with a yield of 21458.33 grams. This study found that the lowest dose provided the most effective treatment compared to previous studies. Provision of solid organic fertilizer is of great assistance in the process of increasing the weight and yield of sweet maize plants. This is consistent with the assertion (Wibowo et al., 2017) that the application of organic fertilizers can enhance the physical, chemical, and biological properties of the soil and the soil structure. Therefore, this technique accurately measures the weight of the sweet corn plant. The application of chicken manure can enhance soil fertility and increase the efficiency of inorganic fertilizers. For this method to expedite plant growth. Manure can increase soil permeability, porosity, water-holding capacity, and cation content.

POC treatment of vegetable waste did not significantly affect production weight parameters using husks per plot (g). This is because a deficiency of element P causes growth retardation and low production and quality of plants.

Nutrients have their respective roles in the growth and development of plants. If the required nutrients are not met, it will affect plant growth and production (Ramadhan 2017).

4. CONCLUSION

The study's results showed that chicken manure and POC vegetable waste had no significant effect on all observed parameters. However, on the plot production weight, the application of chicken manure gave real results in treatment A1 = 700 g/plot with a weight of 2158.33 g.

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