



Provision of POC Coconut Water and Tea Dregs Compost on Plant Growth and Production

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Abstrak: The aims of this research is to determine the response of growth and production of sweet corn (*Zea Mays Saccharata* Strurt) to the application of liquid organic fertilizer coconut water and tea waste compost. The research conducted in Trial Garden of Agriculture Faculty of Medan Area University, Kolam Street no 1 Medan Estate with height 22 m above sea level. Plat topografi and alluvial soil type was done since June up to September 2018. The research is using Random Designing Group Factorial with two factors, such as coconut water POC (K0 = Control (purn); K1 = coconut water POC 50 ml/L; K2 = coconut water POC 100 ml/L; K3 = coconut water POC 150 ml/L), and the giving factors of tea pulp compost (K0 = Control (purn); K1 = tea pulp compost 5 Ton/Ha; K2 = tea pulp compost 10 Ton/Ha; K3 = tea pulp compost 15 Ton/Ha). Repeatedly twice. Parameter which observed are the height of the plant, leaf amount, diameter of the stem, the sample each plot of plant production, plant production each plot. The result of this research is two show that the giving of coconut water POC is not really influencing to the treatment and giving of the tea pulp compost to the treatment and giving of the tea pulp compost is really influencing to the height of the plant, the sample of plant production each plot, plant production each plot but not really influence to the leaf amount and diameter of stem as well as combination among coconut water POC and tea pulp compost is not influencing to all treatments.

Keywords: Coconut water POC; Sweet corn (zea); Tea pulp compost

Introduction

Sweet corn (*Zea mays saccharata* Sturt) is one of the most popular vegetable commodities in the United States and Canada, but now sweet corn consumption is starting to increase in Asia, including Indonesia. In the national economy, corn is the second largest contributor after rice in the food crops sub-sector. Corn's contribution to the Gross Domestic Product (GDP) continues to increase every year, even during times of economic crisis. Corn production of North Sumatra in 2016 was 1,557,462.8 tons with a harvested area of 252,792.6 Ha. This production increased compared to 2012 which reached 1,347,124 tons with a harvested area of 243 772 ha (Badan Pusat Statistik, 2016).

Corn plants grow optimally in loose, well-drained soil with sufficient soil moisture and will wilt if the soil moisture is less than 40% of field capacity or when the

stems are submerged in water (Fahrurrozi et al., 2016; Nugraha et al., 2017; Farrasati et al., 2019; Hasibuan et al., 2022; Neswati et al., 2023). Like other plants, corn also requires nutrients for its survival. These nutrients come from the weathering of rocks in the soil. Therefore, fertilization is one way to provide the nutrients needed by plants. Fertilization can increase corn yields both qualitatively and quantitatively. This is because fertilization can increase the availability of nutrients, plant health and suppress disease development (Prahasta, 2009; Samsudin, 2016; Departemen Pertanian, 2019; Suswati et al., 2022; Azwana & Sihotang, 2023). Coconut water is a plant product that can be used to increase plant growth. Tea dregs are usually thrown away and only become waste 20%, 10% Magnesium (Mg), and 13% Calcium content can help plant growth.

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Method

Time and Place

The research was conducted in the experimental field of the Faculty of Agriculture, University of Medan Area, at Jalan Kolam No. 1 Medan Estate, Percut Sei Tuan District, Deli Serdang Regency with an altitude of 22 meters above sea level, Aluvial soil type, flat topography and soil pH 5-7. The research was carried out from June to September 2018.

Tools and Materials

The tools used in this study were hoes, barrels, buckets, measuring tape, writing instruments, measuring cups, bamboo, tarpaulin, analytical scales, vernier calipers, plastic rope. While the materials used in this study were sweet corn seeds of the Bonanza F1 variety, coconut water, tea waste, EM4, molasses.

Research Methodology

POC Coconut Water consists of 4 levels namely: K0 = Control (without treatment); K1 = POC Coconut Water 50 ml/L; K2 = POC Coconut Water 100 ml/L; K3 = POC Coconut Water 150 ml/L.

Tea Waste Compost

Tea waste compost can be used as a mix growing media, because tea waste contains various minerals such as organic carbon, copper (Cu) (Susetya, 2016; Nainggolan et al., 2020). The following is information about tea waste compost.

T0 = Control (Without Treatment)

T1 = 5 tons/ha of tea waste compost or 0.75 kg/bed

T2 = Tea Dregs Compost 10 tons/Ha or 1.5 Kg/bed

T3 = Tea Dregs Compost 15 tons/Ha or 2.25 Kg/bed

Number of Replications: 2

Replications Number of Trial Plots: 32 Plots

Experimental Plot Area: 1 m X 1.5 m

Distance Between Plots: 50 cm

Plant spacing: 30 cm X 50 cm

Spacing between repetitions: 1 m

Number of Plants Per Plot: 9 Plants

Observed Parameters

The parameters observed during the study were plant height (cm), number of leaves (strands), stem diameter (cm), weight of sweet corn production per sample (g), weight of sweet corn production per plot (g).

Results and Discussion

Plant Height

Based on the results of data analysis of variance showed that the administration of POC coconut water had no significant effect on plant height at 2-7 weeks after plant (WAP). Meanwhile, the application of tea waste compost had a significant effect on plant height at

6-7 WAP. Meanwhile, the combination of POC coconut water and tea dregs compost also did not significantly affect plant height. Application of tea waste compost had a significant effect on height.

Plants are caused by the content of tea compost containing nutrients that are useful for plants, namely phosphorus, nitrogen, calcium, carbon and sulfur. According to Djoehana (1986), Phosphorus is a constituent of the cell nucleus, fat and protein. Phosphorus is active in cell division and stimulates seed growth and flowering. Calcium is a constituent of cell walls, plays a role in maintaining cell integrity and membrane permeability. Nitrogen serves to stimulate vegetative growth.

Table 1. Duncan's Distance Test for Sweet Corn Plant Height with Coconut Water POC Application and Tea Dregs Compost

Treatment	The average plant height at the age of 2-7 WAP	
	6 WAP	7 WAP
T0	239.75 c	319.13 d
T1	284.81 a	358.00 b
T2	278.06 b	351.94 c
T3	288.81 a	369.19 a

Application of tea waste compost had a significant effect on plant height at 6 and 7 WAP due to the slow ability of the compost to decompose perfectly in the soil so that the effect had a longer impact on plants. Sugito (1995) states that soil organic matter is generally unstable, changing into simpler forms or compounds. sooner or later it will happen in the ground.

Number of Leaves

Based on the results of the data analysis of variance, it was shown that the administration of POC coconut water and tea waste compost and their combination did not significantly affect the number of leaves of the sweet corn plant. Giving tea dregs to the planting medium does not affect the increase in the number of leaves because the tea dregs in the planting medium have particles that have not formed aggregates (Direktorat Jenderal Perkebunan Kementerian Pertanian, 2019; Febbiyanti & Fairuza, 2019). The stability of soil aggregates depends on the organic content in the soil and the results of microbes that bind soil particles together (Sriharti & Salim, 2010). Giving POC coconut water has no effect because the dose is not optimal in increasing the growth of sweet corn plants. According to Prabowo (2007), Sihotang et al. (2019), and Sihotang et al. (2022) this can happen because the auxin hormone will increase growth to optimal concentrations.

Stem Diameter

The administration of POC coconut water and tea dregs compost and their combination did not significantly affect the stem diameter of the sweet corn plant. Giving POC coconut water and tea waste compost

did not significantly affect stem diameter due to the amount of nutrient content that was not sufficient to support the growth and development of sweet corn plants because based on the results of nutrient analysis N, P and K in POC coconut water was N of 0.02%, P < 0.005, and K < 0.10. The results of tea compost analysis are N of 2.55%, P < 0.005 and K < 0.09.

Production Weight per Sample (g)

Based on the results of the data analysis of variance, it showed that the administration of POC coconut water had no significant effect on the production weight per sample. Meanwhile, the application of tea waste compost had a significant effect on the production weight per sample, but the combination of POC coconut water and tea waste compost had no significant effect on the production weight per sample of sweet corn plants.

The application of tea waste compost has a significant effect on the production weight of sweet corn because the applied tea waste can add nutrients to the soil, especially nitrogen content. The main function of N is to stimulate cell division so that growth increases and production also increases.

Table 2. Duncan's Distance Test of Sample Planting Production Weight (g) by Applying Tea Dregs Compost to Sweet Corn Plants

Treatment	Average	Notation	
		α.05	α.01
T0	409.06	d	D
T1	635.44	a	A
T2	483.56	c	C
T3	572.56	b	B

The results of the Duncan distance analysis in Table 2 show that the application of tea waste compost at a dose of 5 tonnes/ha (T1) was significantly different from the control treatment (T0), 10 tonnes/ha (T2), and a dose of 15 tonnes/ha (T3). The T2 treatment was significantly different from the T0, T1, and T3 treatments. The T3 treatment was significantly different from the T0, T1, and T2 treatments. The T0 treatment was significantly different from the T1, T2, and T3 treatments.

Production Weight per Plot (g)

Based on the results of the data analysis of variance, it showed that the administration of POC coconut water had no significant effect on the production weight per plot. While the application of tea waste compost had a significant effect on the production weight per plot, the interaction between POC of coconut water and tea waste compost had no significant effect on the production weight of sweet corn per plot. The addition of tea dregs compost had a significant effect on weight production of sweet corn per plot due to nutrient content such as N can increase chlorophyll levels, suppress leaf defoliation and increase root length and weight (Slamet et al., 2004; Slamet, 2005; Ryoo, 2014; Hasyim et al., 2016; Marhaen

et al., 2016; Noer et al., 2023). Another very vital role of tea waste compost is in terms of increasing plant resistance to disease-causing attacks (aerial or soil-born-pathogens) through microbiostatic mechanisms (inhibiting growth, reproduction or multiplication of pathogens) so that production loss or loosing does not occur (Rusmin, 2019; Gupita, 2021; Sartini et al., 2023).

Table 3. Duncan's Distance Test of Production Weight per Plot Sweet Corn (g) with Tea Dregs Compost

Treatment	Average	Notation	
		α.05	α.01
T0	3,687.50	d	D
T1	6,087.50	a	A
T2	4,600.00	c	C
T3	4,900.00	b	B

The results of the Duncan distance analysis in Table 3 show that the application of tea waste compost at a dose of 5 tons/ha (T1) was significantly different from the control treatment (T0), 10 tonnes/ha (T2), and a dose of 15 tonnes/ha (T3). The T2 treatment was significantly different from the T0 treatment. The T3 treatment was significantly different from the T0, T1, and T2 treatments. The T0 treatment was significantly different from the T1, T2, and T3 treatments.

Conclusion

In accordance with the results and discussion, it can be concluded that application of coconut water liquid organic fertilizer (POC) had no significant effect on plant height, number of leaves, stem diameter, production weight of sample plantings and production weight per plot of sweet corn plants. Application of tea waste compost had a significant effect on plant height, production weight per sample plant and production weight per plot, but had no significant effect on the number of leaves and stem diameter of sweet corn plants. The combination of coconut water liquid organic fertilizer (POC) and tea waste compost had no significant effect on plant height, number of leaves, stem diameter, production weight of sample plantings and production weight per plot of sweet corn plants.

Author Contributions

Erwin Pane, Saipul Sihotang, and Marco Y. F Sitompul conceptualized the research idea, designed of methodology, management and coordination responsibility, analyzed data, conducted a research and investigation process; Asmah Indrawaty, Merlyn Mariana, and Adi Fathul Qohar conducted literature review and provided critical feedback on the manuscript.

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Conflicts of Interest

All author declare no conflicts of interest.

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