

TEST OF GOAT MANURE ORGANIC FERTILIZER AND POC OF RICE WASHING WATER WITH SHALLOT SKIN ON INCREASING PRODUCTION OF SWEET CORN (*Zea mays saccharata* Sturt)

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ABSTRACT

Sweet corn is a food crop that is in great demand by the public because it has a sweeter taste than ordinary corn. Sweet corn contains a higher sugar content ($5 \pm 6\%$) than ordinary corn ($2 \pm 3\%$), harvests faster, on average 60-70 days after planting and has high economic value. Increasing the production of sweet corn can be done by improving cultivation techniques, including by improving fertilization. Improvement of fertilization can be done by adding organic matter. This study used a factorial randomized block design (RBD). The first factor was goat manure (K0) = 0 kg/plot, (K1) = 2.4 kg/plot, (K2) = 4.8 kg/plot, and (K3) = 7.2 kg/plot. The second factor was the POC of rice washing water with shallot skin (A0) = 0 ml/plot, (A1) = 600 ml/plot, (A2) = 700 ml/plot and (A3) = 800 ml/plot. The parameters observed in this study were the number of cobs/plants (cob), and cob weight (g). The results showed that the application of goat manure had no effect on the number of cobs/plants (cobs) and had a significant effect on cob weight (g). The best observed parameter results for sweet corn plants were found in the K3 treatment = 7.2 kg/plot. POC administration of rice washing water with shallot skins did not affect all observation parameters. The best results were found in the 800 ml/plot POC treatment.

Keywords: Sweet corn, Goat manure, POC rice washing water with onion skins, Yield increase

INTRODUCTION

Sweet corn (*Zea maysaccharata* Sturt) is a food crop that is in great demand by the public because it has a sweeter taste than ordinary corn, has high economic value and has a faster harvest time. Corn production centers are scattered in various regions in Indonesia, such as Central Java, East Java and Madura, then it is widely planted outside Java Island.

Sweet corn (*Zea mays saccharata* Sturt.) is a commodity that is much needed by Indonesian people as a source of food other than rice. Sweet corn is almost the same as regular corn, the difference is that it contains a higher sugar content (5 – 6%) compared to ordinary corn (2 – 3%) and the average harvest age is 60 – 70 days after planting. Sweet corn is usually consumed when it is fresh and young, because if the sweet corn is harvested too old, the corn will not taste sweet anymore and the quality will decrease. (Pradipta et al. 2013).

According to Mayadewi (2007), an increase in sweet corn production can be done by improving cultivation techniques, including by improving fertilization. Improvement of fertilization can be done by adding organic matter, one of which is manure. Manure can increase soil fertility, increase soil nutrient content, provide micronutrients, improve soil structure and increase the content of microorganisms that play a role in the nutrient cycle in the soil (Suwahyono, 2011).

Fertilizer Goat manure contains a C/N ratio value of 21.12% (Cahaya and Nugroho, 2009). In addition, the nutrient content of goat manure contains N of 1.41%, P content of 0.54%, and K content of 0.75% (Hartatik, 2006).

Rice washing water contains vitamins such as niacin, riboflavin, pyridoxine and thiamin, as well as minerals such as Ca, Mg and Fe which are needed for the growth of fungi. Rice washing water contains several chemical elements such as vitamin B1, nitrogen, phosphorus, and many other nutrients found in the pericarpus and aleurone which are also eroded (Puspitarini, 2018).

Shallot skin contains the hormones auxin and gibberellin which are useful as growth stimulants in plants. Onion skin contains microbes which helps the formation of chlorophyll in plants and encourages plants to bear fruit or flower. In addition, it can prevent leaf, fruit, and flower loss (Lingga et al, 2020).

LITERATURE REVIEW

The demand for corn from year to year continues to increase, especially for food. Indonesia's maize production is estimated to increase by 4% per year in 2005-2010. The use of corn for feed increased by 4.9%, for food it increased by 2%, while the use of corn for industry increased by 3% (Adijaya, 2018).

In Indonesia sweet corn is planted in moor areas or paddy fields using corn farming techniques which greatly affect the yields obtained. In order to maximize yields, land management techniques are needed before planting corn, with the correct process of planting and caring for plants (Firnias, 2019).

So far, meeting the demand for sweet corn plants still depends on the full use of chemical fertilizers, but chemical fertilizers have a negative impact if used continuously. Soil improvement can be done by applying organic fertilizer because it can improve the physical, chemical and biological properties of the soil, fertilize the soil and add nutrients, add humus, affect the life of microorganisms that live in the soil, besides being able to increase the binding capacity of groundwater (Budiman, 2018).

Organic fertilizers are artificial fertilizers derived from plant residues and animal waste. Organic fertilizers have the advantage of being able to improve soil structure, increase soil porosity so as to increase aeration, soil drainage and increase the activity of soil microorganisms. The form of organic material that can support the growth and productivity of corn plants is compost. Compost is organic waste / livestock manure that has undergone a process of decomposition due to interactions between microorganisms (decomposers) working in it (Djaja, 2018). Goat manure fertilizer has the advantage of being able to improve the physical, chemical and biological structure of the soil, and can provide additional organic matter and restore nutrients transported by previous crops.

Rice water waste contains 90% carbohydrates in the form of starch which is important for the hormones auxin, alanine and gibberellin in plants, contains vitamin B1, vitamin K, protein, iron, calcium, phosphorus, boron and also nitrogen. Rice washing water will help several hormones in plants so that they can stimulate the growth of leaf shoots, carry food to all cells in leaves and stems.

Onion skin waste is useful for plants as Liquid Organic Fertilizer (POC). The nutrient content in shallot skins such as Potassium (K), Magnesium (Mg), Phosphorus (P), and Iron (Fe) can be used as liquid organic fertilizers that fertilize plants.

As a Growth Regulatory Substance (ZPT). The shallot skin contains the hormones auxin and gibberellin which are growth hormones so that the shallot skin can be used as a growth regulator (Waluyo, 2020).

METHODS

The materials used were sweet corn seeds, rice washing water, goat manure, 1 liter of water, 1 kg of shallot skin, 2 liters of EM4, and 1 kg of brown sugar, 15 kg of rice husk. The tools used for the research were tarpaulin, tape measure, bellows, scales, camera, stationery, bamboo, hoe, bucket, stirrer, knife, cutting board, barrels, jute, plastic rope. This study used a factorial randomized block design (RBD) which had 2 blocks. The treatment factor I was giving goat manure with the symbol "K" consisting of 4 levels, namely: K0 = 0 kg / plot (Control), K1 = 2.4 kg/plot, K2 = 4.8 kg/plot, K3 = 7.2 kg/plot

Treatment factor II was the application of POC fertilizer, rice washing water and shallot skins with the symbol "A" consisting of 4 levels, namely: A0 = 0 ml/plot (control), A1 = 600 ml/plot, A2 = 700 ml/plot, A3 = 800 ml/plot. Parameters observed such as the number of cobs (cob) and cob weight (g)

RESULTS AND DISCUSSION

Number of Cobs (Cobs)

The results of the analysis showed that the application of goat manure and POC of rice washing water with shallot skins had no effect on the number of cobs/sweet corn plants. The interaction between the two had no significant effect on cob weight.

Table 1. Average Number of Cobs (Cobs) As a result of Administration of Goat Manure and POC Rice Washing Water with Shallot Skins

Treatment	Number of Cobs	
K = Goat Manure		
K0 = 0.0 kg/plot	1,00	aA
K1 = 2,4 kg/plot	1,00	aA
K2 = 4,8 kg/plot	1,00	aA
K3 = 7,2 kg/plot	1,03	aA
A = POC		
A0 = 0 ml/plot	1,00	aA
A1 = 600 ml/plot	1,00	aA
A2 = 700 ml/plot	1,00	aA
A3 = 800ml/plot	1,03	aA

Note: Numbers followed by letters that are not the same show highly significant differences according to the Multiple Range Test (Duncan) at the 5% level (lowercase)

The highest number of sweet corn cobs was found in treatment K3 = 7.2 kg/plot, namely 1.03 cobs, not significantly different from treatment K2 = 4.8 kg/plot, namely 1.00 cobs, K1 = 2.4 kg/plot, namely 1.00 cobs and K0 = 0 kg/plot, which is 1.00 cobs. There was treatment A3 = 800 ml/plot, namely 1.03 cobs, not significantly different from treatment A2 = 700 ml/plot, namely 1.00 cobs, A1 = 600 ml/plot, namely 1.00 cobs and A0 = 0 ml/plot that is 1.00 cobs. From the results obtained that the application of goat manure did not have a significant effect on the number of cobs planted, the results obtained were in accordance with the description of the F1 hybrid sweet corn variety which has the ability to produce 1-2 cobs/plant. This is due to genetic factors, where the number of cobs and cob length cannot increase in size and number due to suitability of varieties and the environment. In accordance with Achmadi's statement (2017) states that the effect on the observational variables is due to differences in genetic factors possessed by each variety of corn and its adaptability to the environment. Varieties that are able to adapt more quickly to their

environment tend to have a better response to growth and yield compared to varieties that are slow to adapt even though genotypes have the same growth ability.

Cob Weight(g)

The results of the analysis showed that the application of organic goat manure had a significant effect on the weight of the cobs (g). The water for washing rice with shallot skins and the interaction between the two had no significant effect on the weight of the cobs.

Table 2. Mean Cob Weight (g) As a result of Giving Goat Manure and POC Rice Washing Water with Shallot Skins

Treatment	Number of Cobs	
K = Goat Manure		
K0 = 0.0 kg/plot	443,75	bA
K1 = 2,4 kg/plot	471,88	aA
K2 = 4,8 kg/plot	534,38	aA
K3 = 7,2 kg/plot	543,75	aA
A = POC		
A0 = 0 ml/plot	468,75	aA
A1 = 600 ml/plot	493,75	aA
A2 = 700 ml/plot	509,38	aA
A3 = 800ml/plot	521,88	aA

Note: Numbers followed by letters that are not the same show highly significant differences according to the Multiple Range Test (Duncan) at the 5% level (lowercase)

The heaviest weight of sweet corn cobs was found in treatment K3 = 7.2 kg/plot, namely 543.75 g, very significantly different from treatment K2 = 4.8 kg/plot, namely 471.88 g, K1 = 2.4 kg/plot, namely 534.38 g and K0 = 0 kg/plot, which is 443.75 g. The heaviest cob weight in treatment A3 = 800 ml/plot, namely 521.88 g, was not significantly different from treatment A2 = 700 ml/plot, namely 509.38 g, A1 = 600 ml/plot, namely 493.75 g and A0 = 0 ml/plot is 468.75 g. From the results obtained, the application of goat manure organic fertilizer had a significant effect on cob weight, this was thought to be due to the sufficient availability of K element in the soil. This is in accordance with the statement of Tuhuteru, (2018) stating that in plants the nutrients K and P have interdependence. Element K functions as a transport medium that carries nutrients from roots including P nutrients to leaves and translocates assimilates from leaves to all plant tissues. Lack of K nutrients in plants can inhibit the assimilate transport process in plants. Therefore, so that the process of transporting nutrients and assimilates in plants can take place optimally, the element K in plants must be optimal, providing optimal N can increase the rate of plant growth. According to Sipayung, et al (2017) stated that more and more transfers of food reserves (which are formed from nutrient uptake) to fruits and seeds will increase their size and quality.

CONCLUSION

The results obtained were that the application of goat manure organic fertilizer did not affect the number of cobs but did affect the weight of corn cobs, with a dose of 7.2 kg/plot giving the best results on the number of cobs and cob weight. Whereas POC for rice washing water with onion skins and the interaction between the two did not show a significant effect on the number of cobs and the weight of sweet corn cobs.

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