The Effect of Providing Nasa POC Concentration and Various Types of Organic Mulch on The Growth and Yield of Purple Eggplant Plant (*Solanum melongena* L)

Hellina Rahmisari[1]*, Kun Rawan Sari[2]

[1,2]Muhammadiyah University of East Kalimantan, Faculty of Agriculture and Digital Business
Tanah Grogot
*Email: hellina.rahmi0791@gmail.com

Abstrak

Pengaruh Perbedaan Mulsa Organik dan Konsentrasi POC NASA terhadap Pertumbuhan dan Hasil Terong Ungu (*Solanum melongena* L.). Selama tujuh bulan, yaitu tanggal 10 Maret hingga 3 September, penelitian dilakukan di Desa Tapis, Kecamatan Tanah Grogot, Kabupaten Paser. Dengan menggunakan rancangan acak kelompok (RAK) dua faktor yang diulang sebanyak tiga kali, tujuan penelitian ini adalah untuk mengetahui dampak pemberian konsentrasi POC NASA dan jenis mulsa organik yang berbeda. Perlakuan konsentrasi POC NASA yang berbeda-beda, yang terbagi dalam tiga taraf yaitu pl (tanpa POC NASA), P2 (20 cc/10 liter air), dan P3 (20 cc/20 liter air), merupakan faktor pertama. Faktor kedua adalah cara berbagai jenis mulsa organik diolah, dan ini termasuk. Pemberian konsentrasi POC NASA, menurut temuan penelitian, berpengaruh nyata terhadap metrik yang diukur, seperti rata-rata bobot buah per tanaman sampel pada panen 1, 2, 3, 4, dan 5, serta bobot buah per plot dan hektar pada panen 1, 2, 3, 4, dan 5. panen ke 1, 2, 3, dan 4. Kemudian pada panen kelima berpengaruh nyata terhadap karakteristik bobot tanaman per sampel. Pada saat yang sama, penerapan berbagai jenis mulsa organik menunjukkan dampak yang signifikan terhadap parameter-parameter yang dicatat, seperti berat buah per sampel tanaman pada panen kelima, berat buah per petak pada panen kelima, dan berat buah per hektar pada panen kelima. Selain itu, perlakuan pertumbuhan tanaman terong ungu terbaik dicapai dengan menggabungkan perlakuan konsentrasi POC NASA dengan mulsa organik konsentrasi 40cc/20 liter air dan menggunakan mulsa jenis jerami padi. Sementara itu, perlakuan interaksi antara konsentrasi POC NASA dan berbagai jenis mulsa organik tidak menunjukkan pengaruh yang signifikan terhadap seluruh metrik yang dievaluasi.

Kata Kunci: Mulsa, POC, Terong

Abstract

The Impact of Different Organic Mulches and NASA POC Concentration on the Growth and Yield of Purple Eggplant (Solanum melongena L.). For seven months, from March 10 to September 3, the research was conducted in Tapis Village, Tanah Grogot District, Paser Regency. Using a two-factorial randomized block design (RAK) that was repeated three times, the purpose of this study is to ascertain the impact of giving NASA POC concentrations and different kinds of organic mulch. The treatment of different NASA POC concentrations, which are divided into three levels: pl (without NASA POC), P2 (20 cc/10 liters of water), and P3 (20 cc/20 liters of water), is the first factor. The second factor is how different kinds of organic mulch are treated, and this includes. Giving NASA POC concentration, according to the research findings, significantly affected the measured metrics, such as the average fruit weight per sample plant at harvests 1, 2, 3, 4, and 5, as well as the fruit weight per plot and hectare at harvests 1, 2, 3, and 4. Then at the fifth harvest, significantly impacted the plant weight characteristics per sample. Simultaneously, the application of diverse kinds of organic mulch demonstrated a noteworthy impact on the parameters noted, such as fruit weight per plant samples from the fifth harvest, fruit weight per plot during the fifth harvest, and fruit weight per hectare during the fifth harvest. Additionally, the treatment of The best growth of purple eggplant plants was achieved by combining NASA POC concentration treatment with organic mulch at a concentration of 40cc/20 liters of water and using rice straw-type mulch. Meanwhile, the interaction treatment between NASA POC concentration and various types of organic mulch showed no significant effect on all evaluated metrics.

Keywords: Eggplant, Mulch, POC

INTRODUCTION

Eggplant plants are widely cultivated in Indonesia and spread to almost all corners of the archipelago. Eggplant is a type of vegetable that everyone likes, both as fresh vegetables and processed into various types ofdishes (Jumini et al, 2009). Eggplant is used as a vegetable because it contains protein, vitamin A, vitamin B, vitamin C (Saparinto, 2013). Eggplant fruit contains quite complete minerals and vitamins, but eggplant fruit has a low phosphoruscontent (Haryoto, 2009). Apart from that, eggplant is also used as a medicine for cancer, hypertension, hepatitis, diabetes,arthritis, asthma and bronchitis (Kandoliya et al, 2015). Eggplant plants are believed to originate from Sri Lanka or India which then spread to Southeast Asia such as China or China. It is believed that the spread of eggplant plants was spread by traders from the Arab region. This is because this plant does not have a name that indicates it comesfrom Greece or Rome.

Eggplant production in East Kalimantan in 2011 was 7,032 tons, in 2012there was an increase of 7,421 tons, in 2013 eggplant production experienced a fairly high increase, namely 11,167 tons, then in 2014 eggplant production increased not too far from 2013, namely 11,724 tons. tons, butin 2015 eggplant production experienced a quite drastic decline, namely 9,901 tons (BPS KALTIM, 2017). POS NASA is a Liquid Organic Fertilizer produced by PT Natural Nusantaraby surface run off and evaporation. Mulch also affects soil moisture indirectly, namely by reducing erosion.

Soil that is experiencing heavy erosion has (NASA). This formula is specifically designed to meet the complete nutritionalneeds of plants as well as livestock and fisheries which is made purely from organic ingredients with a multi-purpose function,namely increasing the quantity and quality of plant production as well as environmental/soil sustainability, K-3 aspects: Quantity-quality- Sustainability),makes hard soil gradually become loose, dissolves remaining chemical fertilizers in the soil (can be utilized by plants, provides all types of macro elements and complete micro elements, can reduce the use of Urea, SP-36 and KCL + 12.5% - 25%.

Fertilization can be done through soil and leaves because of the fact that fertilizing through soil is sometimes less profitable, because nutrients are often leached, and there is interaction with the soilso that these nutrients are relatively less available to plants. This factor prompted theidea to fertilize through leaves (Lingga et al,2002). As we all know, the use of mulch is highly recommended if we are going to cultivate horticultural crops, especially vegetables, because using mulch can reduce production costs. The main purpose

of mulching is to protect the soil and plant roots from the effects of rainwater, cracks, evaporation, suppress weed growth, and to maintain soil productivity. The mulch used is generally sheet plastic mulch or uses plantresidues (organic) in the form of straw, plant stems, sawdust, dill. Using organic mulchon the surface of the land can inhibit the loss of groundwater from the soil (Yunindanova,2010). Mulching generally improves soil moisture, which is caused by reduced water.

The water holding capacity is low, so the soil also has a low organic matter content. If mulch is applied, it will affect thecondition of the soil indirectly it the form of increasing the number and activity of soil. Microorganism thereby having an impact onimproving soil structure (yunindanoya, to increase theproduction of eggplant plants, it is necessary to apply aespecially by utilizing allthe potential natural resources of the agricultural from the literature aboye Ifinally became interested in counducting research entitled the Effect of GivingNASA POC Contration and Various Types of Organic Mulch on the Growth andYield of Purple Eggplant Plants (*Respiratory melongena* L).

RESEARCH METHODS

Time and location of research

The research was conducted for 7 months from March 10 2021 to September 3 2021, in Tapis village, Tanah Grogot District, Paser Regency with an altitude of >500 MDPL, temperature around 260C, rainfall in Paser Regency, Tanah Grogot area in the last five years reaches 158.75 mm. 2010). technology that is cheap, still useful andeasily available at the farmer level, environment, namely by using organic mulch.

Materials and tools

The materials used in this research were Yumi F1 Purple Eggplant Seeds,dolomite lime, NASA POC, rice straw, reeds. The tools used in this research were hoes, machetes, knives, hammers,nails, saws, rulers/meters, buckets, wood, gembors, sprayers, digital scales, stationery, name labels and cameras/cellphones.

Experimental design

The design used in this researchwas a Randomized Group Design (RAK). Which is arranged in a factorial with 2 factors. The first factor is NASA POC (P) consisting of 3 levels, namely.

P1 = Tanpa poc NASA
P2 = POC Nasa 20 ml/ 10 liter air
P3 = POC Nasa 40 ml/20 liter air

The second factor is the provision of Organic Mulch (M) consisting of 3 levels, namely.

M1 = without using mulch
M2 = 2cm thickness of reed mulch/bed
M3 = 2cm thick straw mulch/bed

The resulting combination of treatments:

POC NASA(P)	Organic Mulch (M)		
	M1	M2	M3
P1	P1M1	P1M2	P1M3
P2	P2M1	P2M2	P2M3
P3	P3M1	P3M2	P3M3

There are 2 treatments with 3 levels consisting of 9 plots which are repeated 3 times, there are 27 treatment plots, so the population in each replication is 9 x 4 = 36 sample plants. Then to take sample plants in each plot, this is done using a zig zag method. and the plants that can be used as samples are the middle plants.

Randomization of Treatment(Randomization)

The purpose of randomization in astudy is to reduce the degree of concordance. The randomization system used in this research was a randomization system using social gathering.

Research procedure

Land Preparation

The land is first cleared of existing grass and wood. Land clearing aims to make the land processing process easier.The land is hoeed to a depth of 15 cm, then plots are made with a width of 2 meters, a height of 20 cm, and a length of 3 meters. The map conditions follow the East West direction.

The land that has been processed is leftto dry and then improvements are made to the plot. The time required from making trenches, hoeing the soil until the soil becomes loose and ready to be planted is around 3 months.After processing in the first stage, it is then continued to apply dolomite lime, namely 1 month before planting so that the nutrients in the soil needed by the plants are already available.

Seeding

The seeding place is made into a bed measuring 1 x 1 meter. Then the eggplant seeds are sown. During the eggplant sowing process, make sure the plants get enough water and sunlight. Good seeds forcultivating eggplant are those that have agrowth capacity of above 75%. With such seeds, the need for seeds for one hectarereaches 300-500 grams.

Planting

The first step we need to do before planting is to choose eggplant seeds first. Through seeds, eggplant will grow more. Make sure the seeds you choose are of superior quality,have the same size and shape. Once the seeds have been selected, we can plant the blbits in the bed media that has been prepared. The distance between planting holes is 60 cm and the distance betweenrows is 70 cm.

Giving NASA POC

NASA POC is given 1-2 daysbefore planting by spraying it with a dose of 20 ml/10 liters of water and 40 ml/20 liters of water. When the plants are 2 weeks old, they are sprayed again on the leaves of the plants with the same dose in each treatment, until when the plants are 4-6 weeks old, they are sprayed again withthe same dose in the same treatment.

Providing Mulch

Mulching is carried out before planting blbits in the beds, the beds are given mulch with a thickness of 2.5 cm.With this mulch treatment it is hoped that it will be able to suppress the growth of weedsin the bed area so that the nutrients in the soil can be optimally absorbed by the eggplant plants, and it is hoped that the temperature will be maintained at a lower temperature. stable, so that the roots can work optimally, as well as reducing water and wind erosion, making mulch can be done by chopping it into small pieces andthen the prepared mulch must be dry.

Maintenance

Several maintenance stages that can be carried out include replanting, weeding, watering, pest control. Embroidery is carried out immediately before the plant reaches the age of 15 HST. Weeding also needs to be done so that the eggplant plants are not disturbed by weeds and wild grass. To keep plants from drying out, it isnecessary to water them

sufficiently according to weather conditions. Watering eggplant plants is done after transferring the plants from the seedling media to the beds, watering is done every morning.

Pest control is carried out after there are signs and symptoms of attack. Pests on eggplant plants in the form of stem borer caterpillars usually attack the stems and branches of the plant. Control can be done by mechanical means, namely removing or cutting the parts of the plant that have been attacked.

Harvesting

The first harvest of eggplant plants is carried out after 70-80 days after the seeds are planted. Furthermore, harvesting can be done every 7 days. In one planting season, there can be 1-5 harvests, or even more. The right time to harvest is in the afternoon and the fruit is picked along with the stalk. The characteristics of eggplants that are ready to be harvested are: they have a shiny fruit color and the flesh is not too hard, the size of the eggplant fruit is medium (not too big or too small).

Data retrieval

Plant Height (cm) Plant height is measured from the base above the soil surface to the growing point on the sample plant. High observations were made at the ages of 2, 35 and 4 WAP. after seeing dead plants and replanting is done before the plants reach the age of 15 HST. *Number of Leaves (pieces)* The number of leaves at the age of 2, 3, and 4 WAP on sample plants by counting all fully formed leaves.

Data analysis

To determine the effect of NASA POC concentration and the provision of organic mulch on the growth of purple eggplant plants, the data was obtained using variance analysis. If the variance effect is not significant (F calculated treatment < F table 0.05) no further tests are carried out. Mean while, if the variation sidlk has a significant effect (F calculated treatment > F table 0.05) then proceed with a further significantly different test (BNT) at the 5% level.

Results

The results of the analysis of variance showed that the NASA POCconcentration (P) treatment and the various organic mulch treatments (M) and their interactions (P x M) had no significant effect on the average fruit weight per sample plant (g), per plot (kg) and per hectare (ton). Meanwhile, the interaction(PxM) had no significant effect on the average fruit weight of sample plants per plot (kg) and per hectare (tons). The resultsof the 5% BNT test can be seen in the table below.

Table 1. Average fruit weight per sample plant (g) Organic Mulch (M)

POC NASA (P)		m1 (without mulch)	m2 (reed)	m3 (rice straw)	Rate-rate
p1	(without NASA POC)	10,73	11,10	11,80	11,21c
p2	(20cc/10 liters ofwater)	12,33	13,63	14,13	13,37b
p3	(40cc/20 liters ofwater)	12,83	14,10	15,57	14,17a
Rate-rate		11,97	12,94	13,83	

*The average number followed by the same letter is not significantly different in the 5% BNT test(BNT = 65.07).

Table 2. Average fruit weight per plot (kg) Organic Mulch (M)

POC NASA		m1 (without mulch)	m2 (re ed)	m3 (rice straw)	Rate-rate
p1	(without NASA POC)	1016,42	1051,75	1118,92	1062,36c
p2	(20cc/10 liters of water)	1142,00	1252,25	1318,50	1237,58b
p3	(40cc/20 liters of water)	1182,75	1307,00	1425,25	1305,00a
Rate-rate		1113,72	1203,67	1287,56	

*The average number followed by the same letter is not significantly different in the 5%BNT test (BNT = 0.66).

Table 3. Average fruit weight per hectare (tons)

		(mulch)	m2 (reed)	m3 (rice straw)	
p1	(without NASA POC)	17,89	18,50	19,67	Rate-rate
p2	(20cc/10 liters of water)	20,56	22,72	23,56	18,69c
p3	(40cc/20 liters of water)	21,39	23,50	25,94	22,28b
Rate-rate		19,94	21,57	1287,56	23,61a

*The average number followed by the same letter is not significantly different in the 5% BNT test (BNT = 65.07).

Based on the 5% BNT test in the NASA POC (P) p3 treatment, it shows that the average fruit weight per sample plant weighs (23.61), the average fruit weightper plot (kg weighs (14.17), and   theaverage The average fruit weight per hectare (ton) was (23.61) from the resultsof 5 harvests and was significantly different from the p2 treatment and significantly different from the   pltreatment. Meanwhile, the mulch treatment (M) m3 showed that there was an average fruit weight per sample planting weighing (1287.56) in the average fruit weight per plot (kg weighing (13.83), and the average fruit weight per hectare (tons) weighing (23.06) and is significantly different from the m2 treatment and significantly differentfrom m1 treatment.

DISCUSSION

Based on the results of variance analysis, it shows that the NASA POC concentration treatment had a significanteffect on the observed parameters, including the average fruit weight per sample plant at the 1st, 2nd, 3rd, 4th and 5th harvest, fruit weight per plot at the 1st harvest. , 2, 3, 4, and 5, fruit weight per hectare at the 1st, 2nd, 3rd, and 4th harvest.And a significant effect on the plant weightparameters per sample at the 5th harvest.

The NASA POC concentrationtreatment showed that the p3 treatment (40 ml/20 liters of water) had better plantgrowth, namely in the parameters of plant height, number of leaves, weight per sample plant, weight per plot and weight perhectare. Meanwhile, the lowest plant growthwas found in the PL treatment (without NASA POC).

The increased growth of eggplant plants at a concentration of 40 ml/20 liters of water is due to the fact that at this concentration the nutrients contained inNASA POC can meet the nutritional needs of eggplant plants so that the plant's need for nutrients is met, and triggers better plant growth. This shows that the NASA POC treatment can increase the nutrient elements needed for the growth of eggplant plants.

On the growth of plant height and number of leaves, giving different concentrations did not have a significanteffect. This is because the nutrients needed by plants are not met so these nutrients are not able to be absorbed by plants properly even though environmental factors support them well. Haryati, (2004),

explains thatfertilizing through leaves is not to provide nutrients for the entire plant but is only a complementary fertilizer. Even though the best plant growth did not have an effect on giving a concentration of 20 ml/10 liters of water, the increased growth of eggplant plants at this concentration was due to the concentration of nutrients being available in a balanced state so that it could trigger better growth.

Like wise, the results of observations in the Organic Mulch (M) treatment had a significant effect on theparameters observed, including the weight of fruit per plot of sample at the 5th harvestand the weight of fruit per plot at the 5th harvest, and the weight of fruit per hectare at the 5th harvest and had a significant effect on the parameters. fruit weight per plot plant at the 2nd harvest, and fruit weight per plot at the 2nd harvest.

The organic mulch treatment showed that the m3 (straw mulch)treatment had better plant growth, namely in the parameters of plant height, numberof leaves, number of fruit, fruit weight per sample plant, fruit weight per plot, and fruit weight per hectare. Plant growth in them3 (straw mulch) and m2 (alang-alang mulch) treatments was not much different. Meanwhile, the lowest plant growth was in the m1 treatment (without mulch). According to Damayanti, (2013), decomposition of organic mulch materials can supply nutrients to plants and environmental conditions and make it easier for minerals from organic materials to be used by plants.

Meanwhile, the results of variance in the interaction of NASA POC concentration (P) and Organic Mulch (M) had no significant effect on all observed parameters. This is because the differences in the response of eggplant plants to NASAPOC concentrations do not depend on the type of organic mulch so that when combined they do not influence each other. As stated by Irfan, (2016), if the treatment does not show any interaction, then the treatment only provides each response as a single factor, and acts independently of each other. Seet & Torrie (1993) added that if the interaction is not real then it can be concluded that these factors onlyencourage each other's growth.

The NASA POC concentration and Organic Mulch treatments were not able

to work together to influence the pattern of plant physiological activity at intervals, although among the treatmentstested they were able to support physiological plant growth. Anotherpossibility that causes there to be no real influence on all observed parameters is thatthe interaction between the two treatments does not support each other enough, so thatthe effect on plant roots is not a factor.

In accordance with the opinion of Munawar (2011), who states that good plant growth can be achieved if the factors that influence growth are balanced and profitable. In this case, external factors from the plant itself do not support the activity of the two treatments, because the combination of two particular treatments will not always have a good effect on the plant. There are times when this combination will encourage growth, inhibitgrowth or not respond at all to plant growthand development.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the research results and discussion,it can be concluded as follows:

1. Effect of NASA POC concentration (P) had a significant effect on theaverage plant weight per sample at the 1st, 2nd, 3rd and 4th harvest, plant weight per plot at the 1st, 2nd, 3rd and 4th harvest, plant weight perhectare at the 1st, 2nd, 3rd, 4th and 5th harvests. And had a significant effect on the fruit weight parameters per plant for the 5th harvest sample. The use of NASA POC with a concentration of 40 cc/20 liters p3)of water provided the best growth of purple eggplant plants.

2. The influence of various organic mulches (M) had a significant effect on the parameters of fruit weight perplant in the 5th harvest sample, nuahweight per plot in the 5th harvest, and fruit weight per hectare in the5th harvest. And had a significanteffect on the parameters of fruit weight per plant in the 2nd harvest sample. and 3, plant weight per plot for the 2nd harvest, and fruit weight per hectare for the 2nd harvest. The use of organic mulch of the rice straw type (m3) provides the best plant growth.

3. There was no interaction between the effect of NASA POC concentration and various types oforganic mulch (PxM) on all observed parameters. This shows that differences in the response of eggplant plants to NASA POC

concentrations do not depend on the type of mulch and vice versa.

Suggestion

Based on the results of the research carriedout, it is recommended.

1. When cultivating pakcoy mustard greens, you should first pay attention to seasonal factors, because pakchoy mustard plants are not very resistant to hot summers. And also pay attention to the decomposition process of the planting medium that will beplanted with Pak Choy mustardgreens.

2. Further research needs to be carried out on the concentration of POC BMW and Planting Media in Sawdust Concentration and PlantingMedia and other locations, with different planting seasons.

3. For further research, it is recommended to use BMW POC with a concentration of 7.5 ml/liter of water and possibly more.

4. For further research, it is recommended to use palm oil compost planting media to suppress plant growth and increase soil fertility in order to obtain good nutrients.

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