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Use Effectiveness of Dosage and Application Time Mol of Bamboo Shoot on Growth and Result Cucumber Plants (*Cucumis Sativus* L)

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ABSTRACT

Cucumber plant (*Cucumis sativus* L) is one of the fruit vegetable plants belonging to the pumpkin tribe or *Cucurbitaceae*. Cucumber production in Indonesia according to the Horticultural Production Statistics data of the Ministry of Agriculture (2014) is still very low, at 477,976 tons with a harvested area of 48,578 hectares or only 9.84 tons per hectare. Efforts that can be made to increase the productivity of cucumber commodities are by improving soil fertility by utilizing the available organic material resources around us, as well as providing growth hormones that can stimulate the growth and yield of cucumbers, one of the organic material resources is in the form of MOL (Juwita, M. *et al.*, 2012). This research was conducted from June 2018 to September 2018, in Simpang Nangka Village, Selupu Rejang District, Rejang Lebong Regency, with an altitude of 968.31 M above sea level (BPS, 2014). The experimental design in this study used a Completely Randomized Block Design (RAKL), consisting of 2 factors, namely the MOL dosage and application time, each consisting of 4 and 3 treatment levels. The dosage of MOL for bamboo shoots has a significant effect on all observational variables, this indicates that the dose treatment for bamboo shoots MOL can have a good impact on being used as an ingredient to add soil nutrients to support the growth and yield of cucumber plants. The time of application of Bamboo shoots MOL had a significant effect on plant height, number of leaves, number of productive branches, fruit length per plant, and fruit weight per plant and showed no significant effect on fruit number and fruit diameter. It is suspected that the time of application of Bamboo shoots MOL are less effective for use in the generative phase, but good for use in the vegetative phase.

Keywords: *Cucumber, Dosage of Bamboo Shoots MOL, Application Time of Bamboo Shoots MOL*

INTRODUCTION

Cucumber plant (Cucumis sativus L) is one of the fruit vegetable plants belonging to the pumpkin tribe or Cucurbitaceae. This plant has long been popular and is well known by the people in Indonesia. As a fruit vegetable plant, cucumbers are generally picked or harvested when the fruit is not yet ripe, to be used as vegetables and for food refreshments because cucumbers contain a lot of water. In addition to its high water content, cucumbers also contain high nutritional value as a source of minerals and vitamins, including 0.65% protein, 0.1% fat and 2.2% carbohydrates (Kementrian Pertanian, 2014).

In addition, cucumbers also contain 35,100 - 486,700 ppm of linoleic acid and Cucurbitasin compounds which have properties as anti-tumor drugs, and can reduce high blood pressure and can also be used as facial skin moisturizers in the cosmetic field. The magnitude of the benefits that can be obtained from cucumber fruit, so that the demand for this one commodity continues to increase every year, but this is not offset by an increase in cucumber production per hectare, this is because so far the cucumber cultivation business system has not been carried out intensively (Idris , 2004).

Cucumber production in Indonesia according to the Horticultural Production Statistics data of the Ministry of Agriculture (2014) is still very low, at 477,976 tons with a harvested area of 48,578 hectares or only 9.84 tons per hectare. The production of cucumbers in Rejang Lebong Regency according to data from the Central Statistics Agency (BPS) of Rejang Lebong in 2014 amounted to 11,715.3 tons with a harvested area of 999 hectares, spread over several sub-districts in Rejang Lebong Regency.

The highest cucumber producing area in Rejang Lebong Regency is located in Selupu Rejang District with 74.6%, with a harvested area of 999 hectares and total production of 11,715.3 tons. Cucumber production in Rejang Lebong Regency is not optimal, as can be seen from the total production per hectare which is only 1.28 tons (BPS Rejang Lebong 2014), while the optimal production potential nationally can reach 49 tons per hectare (Kementrian Pertanian, 2014).

Efforts that can be made to increase the productivity of cucumber commodities are by improving soil fertility by utilizing the available organic material resources around us, as well as providing growth hormones that can stimulate the growth and yield of cucumbers, one of the organic material resources is in the form of MOL (Juwita , et al., 2012).

Local Micro-Organisms (MOL) is an alternative organic material that can be used because local Micro-organisms can improve soil conditions, suppress the growth of microbes that cause plant diseases and improve the efficiency of nutrient absorption by plants. Bamboo shoots are one type of plant that has the potential to be extracted into MOL. According to several research results, MOL bamboo shoots contain high growth regulators so that they can stimulate plant growth. Several substances that are believed to be able to encourage plant development such as giberilin, cytokinin, auxin and many inhibitors are contained in MOL (Mauludin, 2009).

Nugroho (2013) stated that bamboo shoots contain 59 mg of Phosphorus, 20.15 mg of Potassium, 13 mg of Calcium, and. 0.50 mg of Iron, while according to Maspary (2012) stated that the content of the gibberyl hormone extract in the MOL of bamboo shoots can be used to stimulate the growth and development of oil palm seedlings. The results of the research by Fauzi et al., (2013) stated that by giving 10 ml/liter of water MOL bamboo shoots showed the most effective growth of green mustard plants. There is still a lack of information about the application of MOL Bamboo shoots, especially for cucumber plants, so the authors are interested in conducting research.

RESEARCH METHODOLOGY

The experimental design in this study used a Completely Randomized Block Design (RAKL), consisting of 2 treatment factors, namely the dose of MOL and the time of application, consisting of 4 and 3 treatment levels, namely : 1) Treatment dose of MOL (D) : D0 = 0 ml, D1 = 15 ml, D2 = 20 ml, and D3 = 25 ml., 2) Perlakuan waktu aplikasi (W) : W1 = Pagi (08:00), W2 = Siang (13:00), and W3 = Sore (17:00)

The study was carried out on land with media beds (plots). The number of replications in this study was 3 times with 2 treatments each consisting of 4 levels of dose treatment and 3 levels of application time treatment, in order to obtain 36 plots of plants, with a spacing of 45 cm x 45 cm, the research plan is presented in appendix 2. This study used 2 sample units determined at 4 experimental plants per plot, so the number of plants was 36 x 4 plant units, so the total number of plants in this study was 144 plant units.

Research implementation procedure are as follows : Production of bamboo shoot Local Micro-Organisms (MOL), Preparation of planting media, Seed preparation and planting plant maintenance giving mole shoots. The variables observed in this study were : 1) Plant Height (cm), 2) Number of Leaves (cm), 3) Number of Productive Branches, 4) Flowering Age (DAP), 5) Number of Fruits, 6)

Total Fruit Weight (g), 7) Fruit length (cm), and 8) Fruit diameter (cm). The data obtained were analyzed using the 5% ANOVA test, if there is a significant difference, it will be further tested using the 5% DMRT test.

FINDINGS AND DISCUSSION

FINDINGS

The initial stage of carrying out the research began by collecting the required materials, then making a MOL solution for bamboo shoots according to the stages. The next stage is cultivating the planting area and providing basic fertilizer in the form of 250 grams of chicken manure per planting hole, planting the seeds after 7 days have passed, given 2 seeds per planting hole with a depth of 1 cm. In the first week, the seeds that failed to grow were replanted and stakes were installed. In the next week, labels and treatment with MOL bamboo shoots were given routinely every week until the fifth week according to the combination of research treatments.

At the time of the research in the field coincided with the ongoing dry season, so that watering was carried out every afternoon on each planting medium in the experimental plant unit, as well as spraying insects to deal with pests that might interfere with the experimental plants. Follow-up fertilization was carried out at the age of 3 weeks with a type of complex inorganic fertilizer (NPK Mutiara) with a dose of 5 grams per planting hole, and weeding of weeds that grew around the experimental plants when the plants were 4 weeks old, as well as binding the plants to the stakes so that the plants could grow. vertical.

Routine maintenance is carried out every afternoon after the plant is 4 weeks old in the form of watering and monitoring the growth of elongated plant tendrils to be directed at the top of the stake as well as observing the number of leaves, flowering age and the number of flowers that grow. Harvesting is done on cucumbers that already have harvest criteria, the yields are weighed and measured according to the observed variables.

DISCUSSION

The MOL dose of bamboo shoots had a significant effect on all observational variables consisting of plant height, number of leaves, number of productive branches, age of flowering, number of fruit, total fruit weight, fruit length and fruit diameter. This shows that the MOL treatment of bamboo shoots gave a good response to being used as an ingredient to add soil nutrients to support the growth and yield of cucumber plants. One of the good soil nutrients is obtained through the activity of microorganisms that are able to decompose organic matter in the soil, so that it can facilitate the absorption of macro and micro nutrients available by plant roots, as well as growth hormones that are able to stimulate the growth and development of plant organ tissues (Maspary, 2012).

Table 1. Results of ANOVA Growth and Cucumber Yield with the Use of Dosage and Time of Administration of MOL Bamboo Shoots

Variable	F-Value			KK (%)
	Dossage (D)	Time (W)	Interaction (DW)	
Plant Height	29605.68*	1586.24*	480.02*	0.22%
Number of Leaves	298.43*	15.72*	8.31*	2.75%
Number of Productive Branches	490.85*	6.04*	1.24ns	4.85%
Flowering Age	299.91*	1.57ns	0.40ns	1.18%
Number of Fruits	89.60*	3.05ns	2.10ns	15.20%
Total Fruit Weight	76.01*	3.60*	2.15ns	16.46%
Fruit Lengths	142.64*	6.09*	0.95ns	2.76%
Fruit Diameter	42.70*	10.94ns	1.33ns	4.41%

The treatment time of application of MOL Bamboo shoots had a significant effect on plant height, number of leaves, number of productive branches, and fruit length per plant as well as total fruit weight. It is suspected that the time of application of MOL Bamboo shoots determines several factors that have an impact on the growth response and yield of cucumber plants. Environmental conditions in the field showed that the time of giving MOL Bamboo shoots in the afternoon and morning, increased the risk of evaporation that occurred in the treatment given, being higher when compared to the time of giving in the afternoon. It also determines how effectively microorganisms, growth hormones and the nutritional content contained in MOL Bamboo shoots can have an impact on plants.

Furthermore, the interaction of dose treatment and application time of giving MOL Bamboo shoots had a significant effect on the variables of plant height and number of leaves, while on the number of productive branches, flowering age, fruit number, total fruit weight, fruit length and fruit diameter, interaction of dose treatment and application time. MOL administration of bamboo shoots showed no significant effect. This shows that the interaction of dose treatment and time of application of MOL Bamboo shoots is only able to have an impact on the two variables that are oriented to plant vegetative vases, so for other experimental variables it is necessary to do research with other methods.

Table 2. Further test of DMRT treatment Dosage of giving MOL Shoots on Cucumber Growth and Yield.

Dossage (D)	Plant Height	Number of Leaves	Number of Productive Branches	Flowering Age	Number of Fruits	Total Fruit Weight	Fruit Lengths	Fruit Diameter
D0 (0 ml)	80.5 d	12.94 d	5 d	31.61 d	1.17 d	294.39 d	14.31 d	3.63 d
D1 (15)	92.77 c	15.27 c	8.83 c	30.17 c	2.17 c	586.47 c	15.4 c	4.14 c
D2 (20)	97.6 b	16.56 b	11.22 b	28.28 b	3.28 b	873.68 b	17.11 b	4.33 b
D3 (25)	109.37a	19 a	12.78 a	27.11 a	4.11 a	1066.01 a	18.36 a	4.58 a

The D3 treatment, the dose of 25 ml MOL Bamboo shoots showed the highest value in each variable. This indicates that the administration of doses below 25 ml does not show optimal results. It can be seen that the plant height variable in the D3 treatment at a dose of 25 ml MOL. Bamboo shoots have a value of 109.37 cm. This shows better results than the results of previous research by Ridwansyah and Wibowo (2016) which showed the best value for plant height of 97.46 cm against Bandana hybrid varieties. This indicates that by giving a dose of 25 ml of MOL solution, bamboo shoots gave a good response to the increase in growth hormone around shoot meristematic cells. The increase in hormone content is thought to stimulate the division and enlargement of meristematic cells around the growing point area, thereby causing an increase in plant height (Ridwansyah and Wibowo 2016).

Furthermore, the number of leaves in the D3 treatment variable has a leaf number of 19 strands, this shows better results than the results of previous research by Ridwansyah and Wibowo (2016) which showed the best value for the variable number of leaves of 16.40 strands against the Bandana hybrid variety. This indicates that the adequacy of macro and micro nutrients contained in the soil is able to support the growth of plant organs, especially the growth of plant leaves. Hermawan (2011) states that the availability of sufficient nutrients during the growth process will increase photosynthesis so that cell division, enlargement and differentiation will be better. With the help of growth hormones, these more reactive compounds are thought to stimulate cell division and development in plant organ tissues, thereby promoting the growth and development of plant organs.

Furthermore, the number of productive branches in the D3 treatment, which is a dose of 25 ml MOL. Bamboo shoots have a value of 12.78 the number of branches. This is presumably because the balance of essential nutrients is sufficient, essential nutrients are really needed by plants for the growth and development of plant organs. This is in line with the opinion of Lakitan (2010) which

states that plants that have not received sufficient intake of essential nutrients will not be able to complete their life cycle to produce seeds, thus giving a dose of MOL Bamboo shoots has an impact on increasing the intake of essential nutrients contained in soil that can meet the intake of essential nutrients needed by plants, thereby affecting the growth of productive branches of cucumber plants.

Table 3. Further test of DMRT treatment Time of application of MOL on Shoots on Cucumber Growth and Yield.

Time (W)	Plant Height	Number of Leaves	Number of Productive Branches	Total Fruit Weight	Fruit Lengths
W1 (Morning)	92.56 c	15.42 c	9.25 b	663.36 b	16.01 b
W2 (Afternoon)	95.28 b	16 b	9.29 b	673.71 b	16.23 b
W3 (Evening)	97.33 a	16.42 a	9.83 a	778.34 a	16.64 a

The W3 treatment with the time of application of MOL Bamboo shoots in the afternoon showed the highest value in each variable, this indicates that the W3 treatment, namely the time of application of MOL Bamboo shoots in the afternoon, was the best treatment. This is in line with the opinion of Nasrullah et al., (2015) which states that the best time to water plants is in the afternoon after 17:00.

Table 4. DMRT follow-up test Interaction of treatment Dosage and time of application of MOL Bamboo Shoots on Cucumber Growth.

Interaction	Variable	
Dossage & Time Aplication (DW)	Plant Height	Number of Leaves
D0W1	80.433 j	12.833 h
D0W2	80.533 j	12.833 h
D0W3	80.533 j	13.167 h
D1W1	91.4 i	15g
D1W2	92.4 h	15.333 g
D1W3	94.5 g	15.5 fg
D2W1	95.533 f	16.167 ef
D2W2	97.633 e	16.5 de
D2W3	99.633 d	17 cd
D3W1	102.767 c	17.333 c
D3W2	110.567 b	19.333 b
D3W3	114.767 a	20.333 a

Based on the results of further tests in Table 5, it shows that in the D3W3 treatment interaction, the dose of 25 ml MOL Bamboo shoots and the time of application in the afternoon showed the highest value for the variable plant height and number of leaves, so the dose of 25 ml MOL Bamboo shoots was applied in the afternoon. days showed the best treatment for increasing vegetative growth of cucumber plants, especially on the variables of plant height and number of leaves. This shows that the Microorganisms and Phytohormones contained in MOL Bamboo shoots support better nutrient absorption of various nutrients available in the soil, and with the help of growth hormones, compounds that are more reactive are thought to stimulate cell division and development of tissue cells, especially shoot menristem cells. This causes an increase in height and the formation of organs in the form of plant leaves.

CONCLUSION AND SUGGESTION

1. The dosage of MOL for bamboo shoots has a significant effect on all observational variables, this indicates that the dose treatment for bamboo shoots MOL can have a good impact on being used as an ingredient to add soil nutrients to support the growth and yield of cucumber plants.

2. The application time of giving MOL Bamboo shoots in the afternoon can be recommended as the best time for giving MOL Bamboo shoots in cucumber cultivation.
3. The dose of 25 ml MOL Shoots and the time of application in the afternoon showed the best treatment for increasing the vegetative growth of cucumber plants.

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